National Aeronautics and
Space Administration

1977 Mishap and Injury Data

OFFICE OF SAFETY AND ENVIRONMENTAL HEALTH
Washington, D.C. 20546

FOREWORD

This report contains statistical and narrative data concerning NASA mishap and injury experience for calendar year 1977. Injury data is reported for full-time NASA civil servants and injury summary information is also included for contractors at five installations. Frequency and severity information is not available for the contractors. Total mishaps include three fatalities and some other accidents reported at NASA contractor facilities and operations. There was one civilian fatality at one center, and there were two NASA employees killed during 1977 while on duty. Both were killed in commercial aircraft crashes.

There were three mission failures in 1977. A Delta carrying the GEOS/ESA spacecraft did not reach the planned orbit; a Delta carrying an OTS/ESA spacecraft failed to achieve orbit; then an Atlas-Centaur carrying a Comsat Communications Satellite malfunctioned and was destroyed.

Fire incidents were at an all time low for 1977. The controls and attentiveness our people are exercising in this area is outstanding, and we urge them to continue their vigilance. We may also be reaping a return from our investment in fixed fire protection.

Our aviation record, although slightly tarnished in 1977, continued good. There were only three NASA aviation related incidents, and there was one contractor Type B accident.

Our lost time injury/frequency rate continued to increase to a new high, and the chargeback billing which the Office of Workmen's Compensation imposes on NASA for reimbursement was almost three million dollars. Fortunately there was a drop in the automotive accident frequency rate and costs. Each installation should examine the administration of the Continuation of Pay program (CoP) and lost time charged to Workmen's Compensation to minimize employee abuse without limiting justifiable claims. Top management attention can, and has at some installations, dramatically reduced the NASA loss.

Supervisory personnel should extend themselves to oversee potentially hazardous operations so as to preclude, whenever possible, employees from taking shortcuts and perhaps injuring themselves. If more managers visited the NASA workplace more often, I am convinced our accident/injury rates would be reduced considerably. Our most hazardous operations tend to have the fewest injuries. The eight-year continuous rise in our accident/injury rates requires special attention by management and supervisory personnel.

The statistical information presented in this report is designed to assist each NASA employee in evaluating how his work environment historically stacks up against the rest of NASA for his safety and health. Please, in the future, use these lessons from the past to avoid more loss and grief.

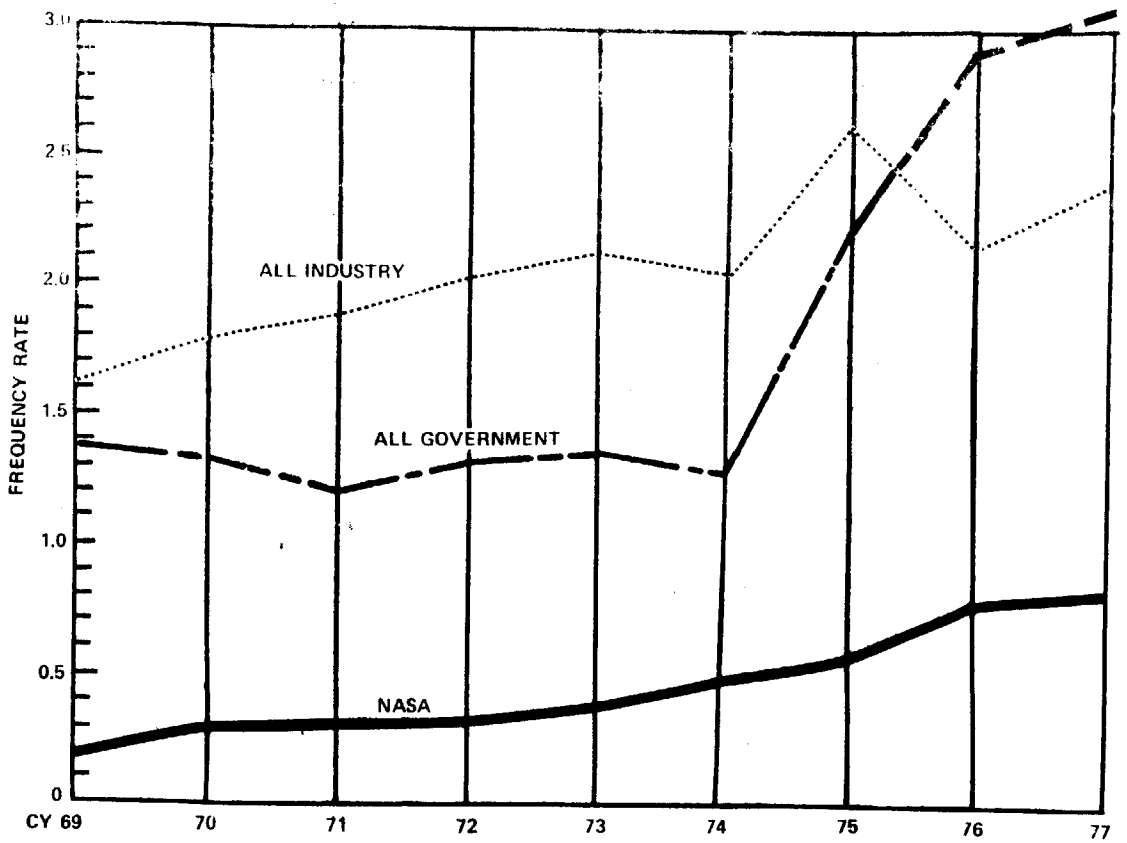
R P Prichard

Reuben P. Prichard
Acting Director, Safety and
Environmental Health Division
Office of the Chief Engineer

TABLE OF CONTENTS

	PAGE
FOREWORD	i
COMPARISON OF NASA VS. OTHER ORGANIZATIONS	2
COST OF 1977 NASA ACCIDENTS/INCIDENTS/INJURIES	3
NASA ACCIDENT/INJURY EXPERIENCE IN 1977	8
TYPE A/B ACCIDENTS AND INCIDENTS	9
FATAL ACCIDENTS AND NUMBERS OF FATALITIES	10
SAFETY AND ENVIRONMENTAL HEALTH SURVEYS	25
OCCUPATIONAL ILLNESSES	26
NASA PERSONNEL INJURY DATA	27
ACCIDENT CAUSE ANALYSIS REPORT	28
NASA INJURIES AND ILLNESSES BY INSTALLATIONS	30
NASA INJURY FREQUENCY RATE	33
NASA INJURY SEVERITY RATE	34
AUTOCORRELATED INJURY AND FREQUENCY RATES	35
STATISTICAL CHANCE OF BEING INJURED IN NASA FIELD INSTALLATIONS, 1977 VS. 1976	38
NASA AVIATION ACCIDENT/INCIDENT EXPERIENCE	41
NASA MOTOR VEHICLE ACCIDENTS	45
NASA FIRE EXPERIENCE	49
LOST-TIME INJURY BRIEFS (NASA)	52
LOST-TIME INJURY BRIEFS (CONTRACTORS)	59

NASA INJURY EXPERIENCE 1969 THROUGH 1977



	CY 69	70	71	72	73	74	75	76	77
FREQUENCY RATE - NASA	.20	.29	.30	.30	.37	.49	.54	.77	.83
* FREQUENCY RATE - ALL GOVERNMENT	1.38	1.32	1.20	1.30	1.36	1.28	2.25	2.91	3.14
† FREQUENCY RATE – ALL INDUSTRY	1.62	1.77	1.87	2.03	2.11	2.04	2.62	2.17	2.48
AVERAGE NUMBER OF NASA EMPLOYEES	32,600	31,200	29,100	28,300	27,900	26,700	26,023	25,794	25,015
LOST TIME INJURIES - NASA	63	85	83	79	93	116	127	175	190

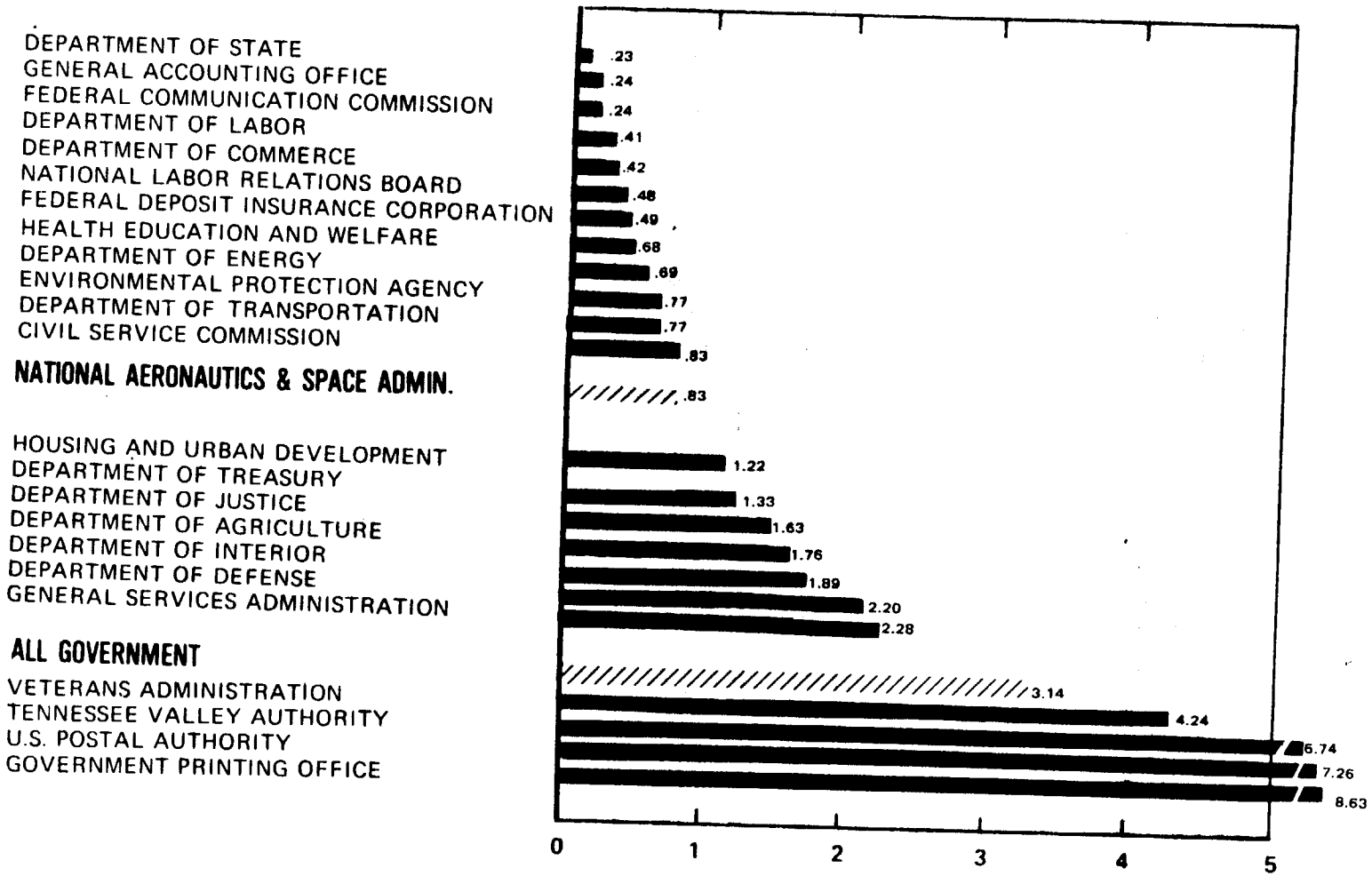
FREQUENCY RATE IS DEFINED BY OSHA AS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED.

NASA HQ DS76 3076 (1)
5-9-78

* SOURCE : OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION, DEPT. OF LABOR

† SOURCE : NATIONAL SAFETY COUNCIL

LOST WORK DAY CASES IN FEDERAL AGENCIES - 1977
OCCUPATIONAL INJURY RATES FOR CIVILIAN PERSONNEL
PER 200,000 MAN-HOURS



SOURCE: Occupational Safety and Health Administration, U.S. Department of Labor

NASA HQ YZ76-3082 (1)
4-30-76

COST OF 1977 NASA ACCIDENT/INCIDENT/INJURIES

MANPOWER LOSS		2	FATALITIES
		236	NON-LOST TIME INJURIES
		191	LOST TIME INJURIES
		14,777	WORK DAYS LOST=56.8 MAN-YEARS EFFORT (6,000 DAYS CHARGED PER FATALITY)
MONEY LOSS	WAGES (ESTIMATED COP COSTS)	$ 152,104	
	CHARGE BACK BILLING TO FEDERAL EMPLOYEES COMPENSATION FUND (FY 1977)	$2,901,054	
			No. OF MISHAPS
MATERIAL LOSS	AIRCRAFT	11,664	3
	VEHICLES	18,058	72
	FIRE	5,850	21
	OTHER PROPERTY	63,574	15
TOTAL LOSS		$3,152,304	112

DOES NOT INCLUDE CONTRACTOR DATA

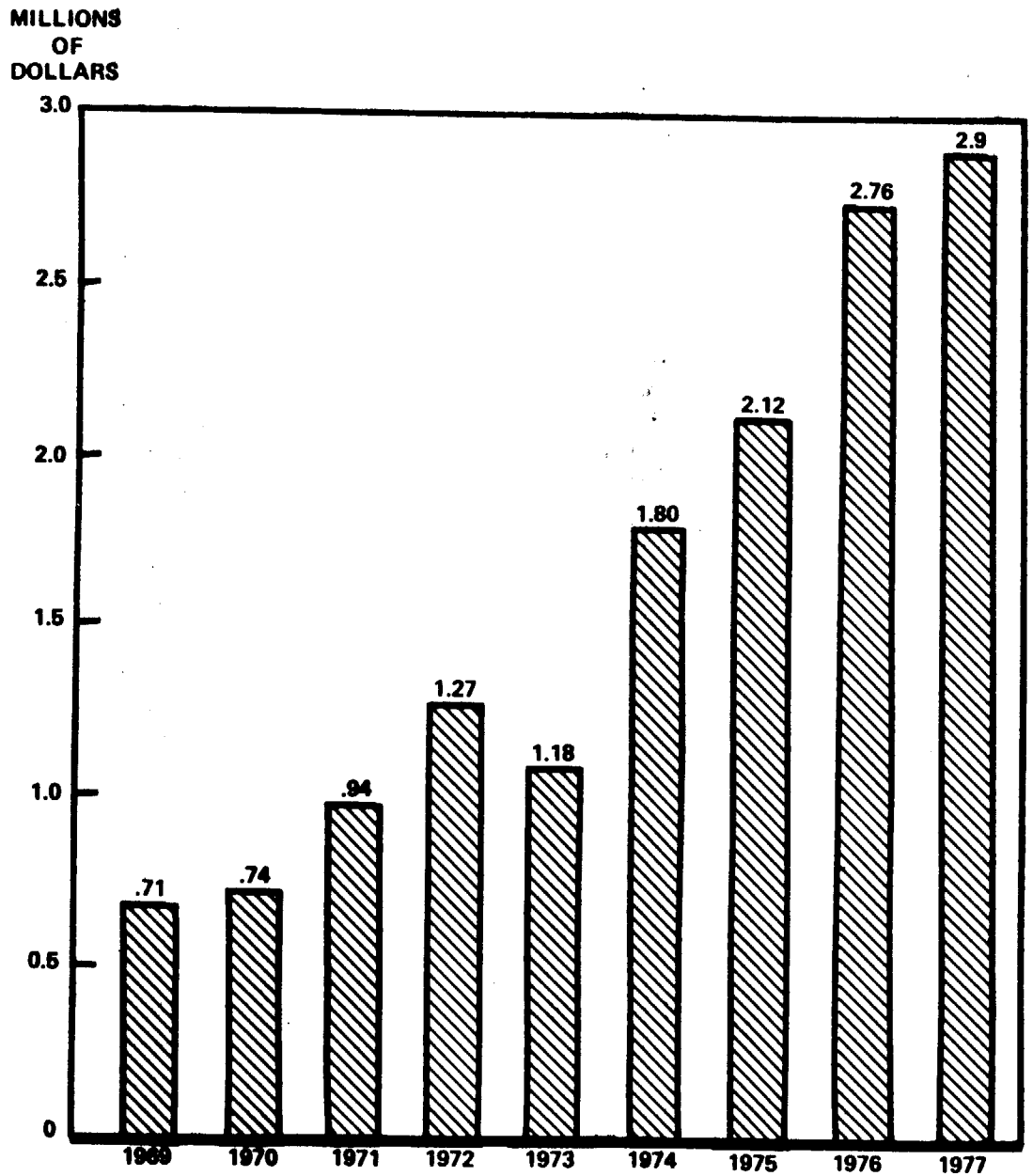
DOES NOT INCLUDE FUTURE COSTS FOR THE FATALITIES; SINCE THEY WILL BE PART OF THE ANNUAL CHARGEBACK BILLING

DOES NOT INCLUDE THREE MISSION FAILURES ($60 MILLION REIMBURSED COSTS)

DOES NOT INCLUDE TWO TEST OPERATIONS FIRES ($5.7 MILLION)

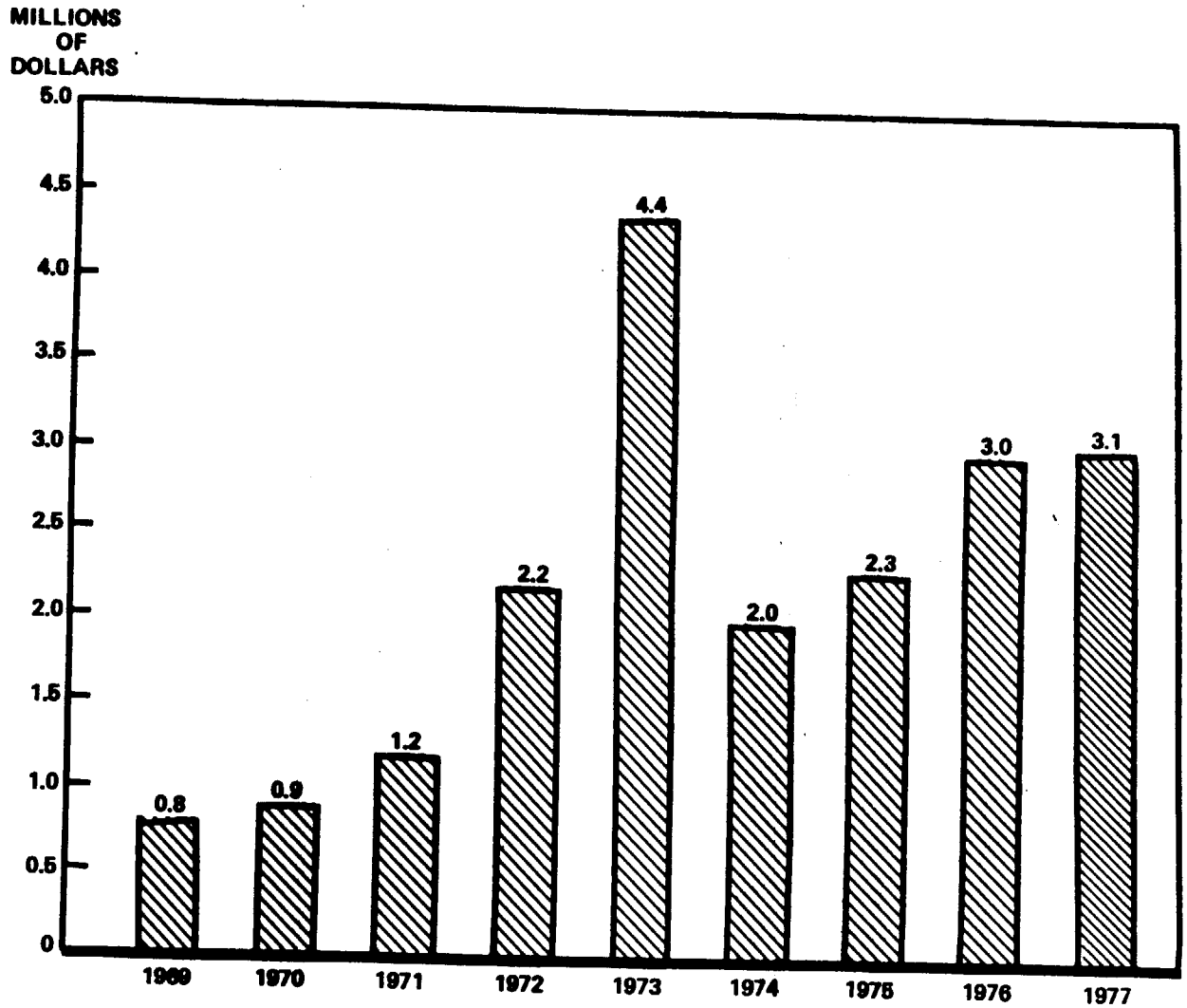
COSTS NASA PAID TO FEDERAL EMPLOYEES COMPENSATION FUND (BY FISCAL YEARS)

THESE COSTS ARE CHARGED TO NASA AS REIMBURSEMENT TO THE FEDERAL EMPLOYEES COMPENSATION FUND FOR PAYMENTS MADE BECAUSE OF INJURY OR DEATH OF NASA EMPLOYEES OR PERSONS UNDER THE JURISDICTION OF NASA.



NASA HQ D678-2345 (1)
Rev. 6-29-78

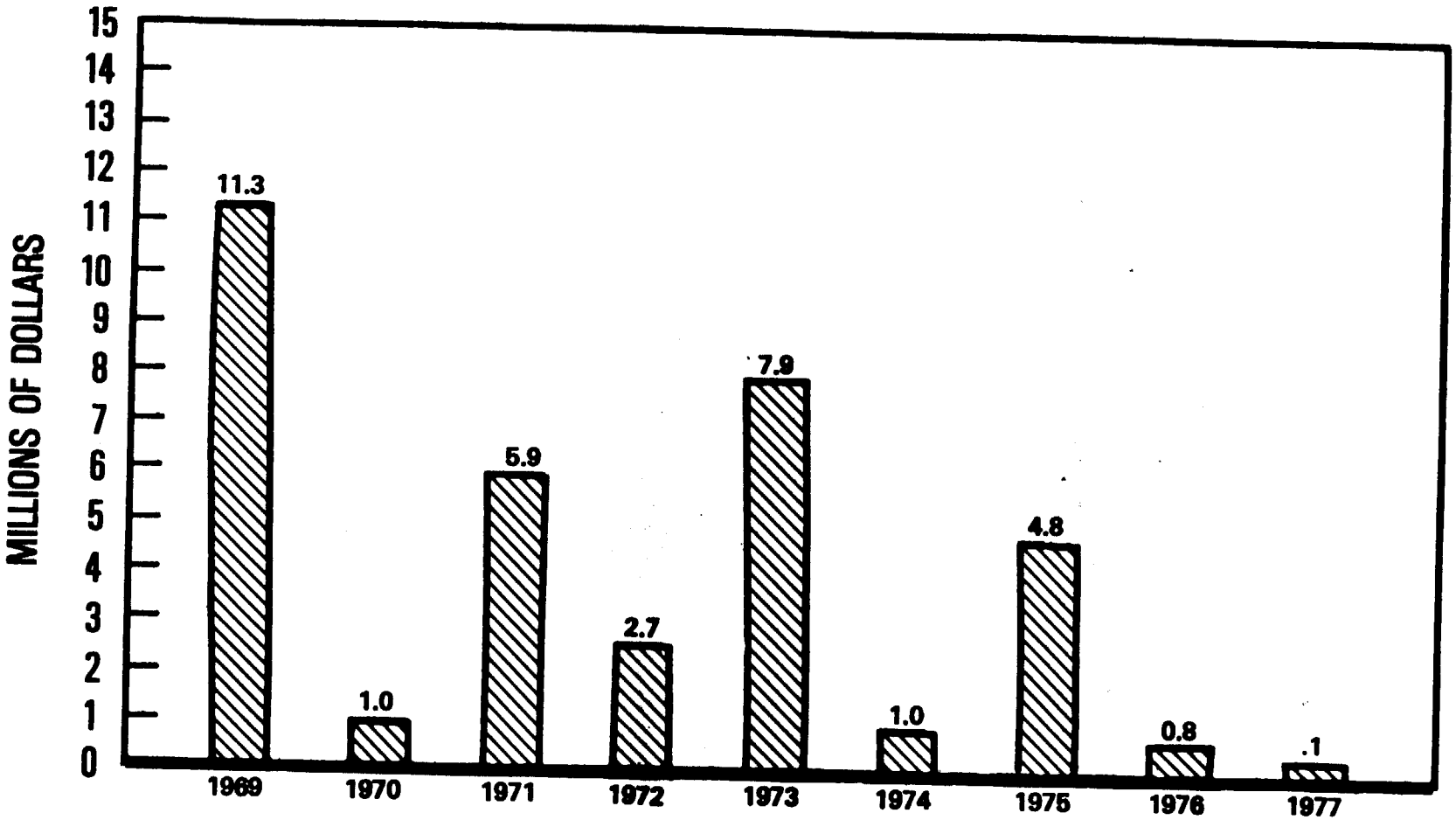
NASA MONEY * LOSSES DUE TO MISHAPS



* INCLUDES LOST WAGES AND CHARGE BACK BILLING TO THE FEDERAL EMPLOYEES COMPENSATION FUND, BUT DOES NOT INCLUDE CONTRATOR LOSSES.

NASA HQ DS78-2203 (1)
Rev. 6-30-78

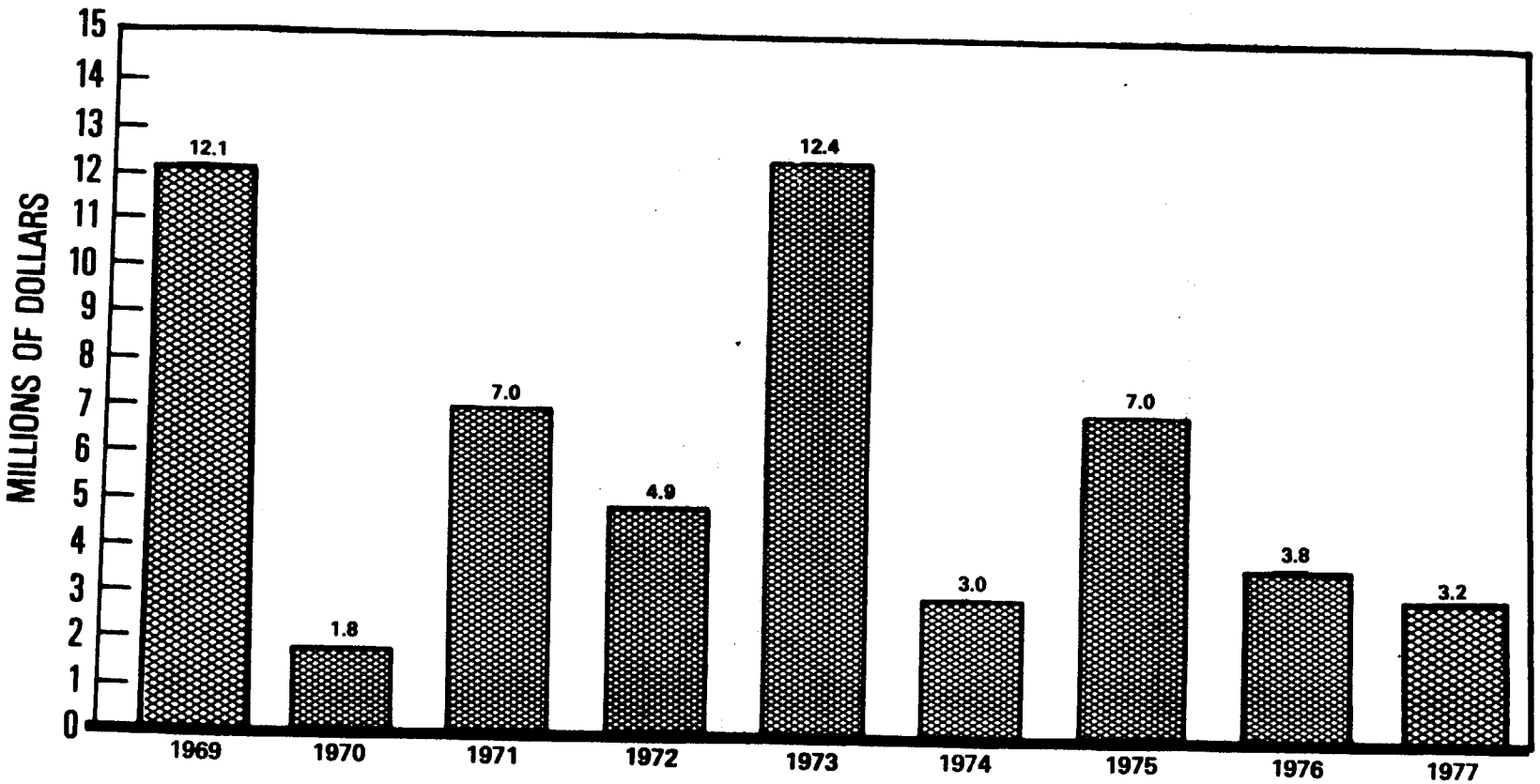
NASA MATERIAL LOSSES DUE TO MISHAPS *



* INCLUDES AIRCRAFT, VEHICLE, AND FIRE MISHAPS AND LOSSES OF OTHER PROPERTY.
DOES NOT INCLUDE CONTRACTOR LOSSES.
DOES NOT INCLUDE 3 MISSION FAILURES. ($60 MILLION REIMBURSED-1977)
DOES NOT INCLUDE $5.7 MILLION TEST OPERATIONS LOSSES - 1977.

NASA HQ D676-2585 (1)
Rev. 6-29-78

TOTAL COSTS TO NASA DUE TO MISHAPS*



* DOES NOT INCLUDE CONTRACTOR LOSSES.

* DOES NOT INCLUDE 3 FAILURES. ($60 MILLION REIMBURSED - 1977)

* DOES NOT INCLUDE $5.7 MILLION TEST OPERATIONS LOSSES - 1977.

NASA HQ DS76-2586 (1)
Rev. 6-29-78

NASA ACCIDENT/INCIDENT EXPERIENCE IN 1977

DEFINITIONS:

1. Type A Accident - A mishap causing death, disabling injury to five or more persons, damage to equipment or property exceeding $100,000, or destruction of an aircraft.
2. Type B Accident - A mishap causing disabling injury to four or fewer persons or damage to equipment or property exceeding $10,000, but under that of a Type A accident.
3. Incident - A mishap of less than accident severity to persons or property, causing less than $10,000 in damages, but exceeding $100, or a non-serious injury.
4. Mission Failure - Any event which jeopardized a mission, prevents accomplishment of major mission objectives, or causes premature mission termination.
5. Costs - Direct costs of repair, replacement, or recovery; including man-hours, material, and contract costs, but excluding indirect costs of clean-up, investigation, injury, and normal operational delay.

TOTAL NASA SIGNIFICANT MISHAPS

The significant mishaps shown on the following charts are only those reported by the NASA Field Installations and contractors as having significance beyond the minor dollars loss or injury incident categories.

	1969	1970	1971	1972	1973	1974	1975	1976	1977
FATAL ACCIDENTS	4	2	2	3	2	2	3*	1*	6¢
TYPE A ACCIDENTS	11	7	13	11	4	6	10	3	13
TYPE B ACCIDENTS	7	11	11	7	6	11	12	16	7
INCIDENTS	12	20	24	9	22	13	8	6	7
MISSION FAILURES	1	1	3	0	3	2	2	0	3
ALL MISHAPS	30	38	48	27	32	30	30	25	27

* NON-NASA FATALITIES

¢ FOUR NON-NASA FATALITIES
TWO NASA EMPLOYEES WERE KILLED IN COMMERCIAL AIRCRAFT CRASHES WHILE ON DUTY

FATAL ACCIDENTS AND MISSION FAILURES ARE INCLUDED IN TYPE A ACCIDENTS

TYPE A/B ACCIDENTS BY FIELD INSTALLATIONS

	1969	1970	1971	1972	1973	1974	1975	1976	1977
AMES	0/0	0/0	0/0	0/0	1/0	0/2	1/0	1/1	0/0
DRYDEN	0/1	1/0	1/0	0/0	0/0	0/0	0/0	0/0	0/0
GODDARD	4/0	0/3	2/3	0/1	0/0	0/1	0/2	0/1	0/3
JOHNSON	1/1	3/1	3/3	6/2	1/0	0/5	0/1	0/0	2/1
KENNEDY	2/1	2/1	1/0	1/0	0/1	2/1	4/1	0/0	2/1
LANGLEY	0/1	0/1	1/0	0/1	0/1	0/1	0/2	1/1	0/0
LEWIS	1/0	0/0	3/0	2/0	0/1	0/0	0/1	0/1	0/0
MARSHALL	3/2	1/4	3/3	6/2	1/0	1/0	1/1	0/0	1/0
NSTL	-	-	-	-	-	0/0	0/1	0/1	1/0
WALLOPS	1/0	0/1	0/2	0/0	0/0	1/1	0/0	0/1	1/1
TRACKING STATIONS	-	-	-	-	1/3	2/0	2/2	0/3	1/0
HDQTRS.	-	-	-	-	-	-	2/1	0/0	0/1
TEST OPERATIONS	-	-	-	-	-	-	-	1/7	2/0
MISSION FAILURES	-	-	-	-	-	-	-	-	3/0
NASA TOTAL	12/6	7/11	14/11	15/6	4/6	6/11	10/12	3/16	13/7

Notes: Prior to 1974, MSFC included NSTL.

TEST OPERATIONS and MISSION FAILURES recognize those types of failures which do not normally relate directly to the day-by-day operations at a facility, and they also include the high risk activities associated with testing.

JPL has been excluded from this table; however, they had one Type "B" fire in 1977.

This year we have continued the category of "Test Operations" in lieu of an Installation. It reflects the accidents which occur during particularly hazardous test operations at NASA locations or away from NASA installations, e.g., Santa Susanna, CA. This in no way reduces any safety responsibilities for NASA operations. However, it recognizes that some mishaps occur at facilities where the nature of the test operation involves predictably high risk/hazard and/or the NASA overview is considerably diminished. They also include development and other marginal tests which are designed to approach maximum capabilities of the equipment. These should not be statistically charged to a NASA field installation which may be half a continent away or which may have the responsibility of testing the hardware to determine maximum capabilities.

This year we have added Mission Failures to reflect those mishaps related to launch vehicle failures or a class of failures which is not test operations; yet the accident should not be charged to a specific center; because that center may not have total responsibility for the hardware development and operation.

The combination of Type "A" and "B" accidents in 1977 was 20 as compared to 19 in 1976; however, the number of Type "A" accidents was more than four times the number for 1976. There does not appear to be a discernible pattern of lack of supervision, but the randomness of the accidents and the fact they occurred at all is indicative of a need for tightening up test and operational procedures. This should include design reviews of test items, test stand apparatus and procedures, and compatibility of the associated ground support equipment.

FATAL ACCIDENTS AND FATALITIES

	1969	1970	1971	1972	1973	1974	1975	1976	1977
NUMBER OF FATAL ACCIDENTS	4	2	2	3	2	2	3	1	6
TOTAL NUMBER OF FATALITIES	4	2	5	4	17	3	3	1	6
NASA EMPLOYEES	0	0	0	2	7	0	0	0	2
CONTRACTOR EMPLOYEES	4	2	3	2	4	1	1	1	3
PUBLIC	0	0	2	0	1	2	2	0	1
MILITARY	0	0	0	0	5	0	0	0	0

Three of the four non-NASA fatalities involved automotive vehicles. A contractor employee ran in front of a company truck on U.S. Property and was killed. Another contractor employee driving a leased vehicle ran off the road into a stone fence and was killed. A third individual while riding a motorcycle on U.S. Property was involved in an accident and was killed. The fourth fatality occurred when a NASA owned tug, being operated by a contractor, capsized and one individual drowned.

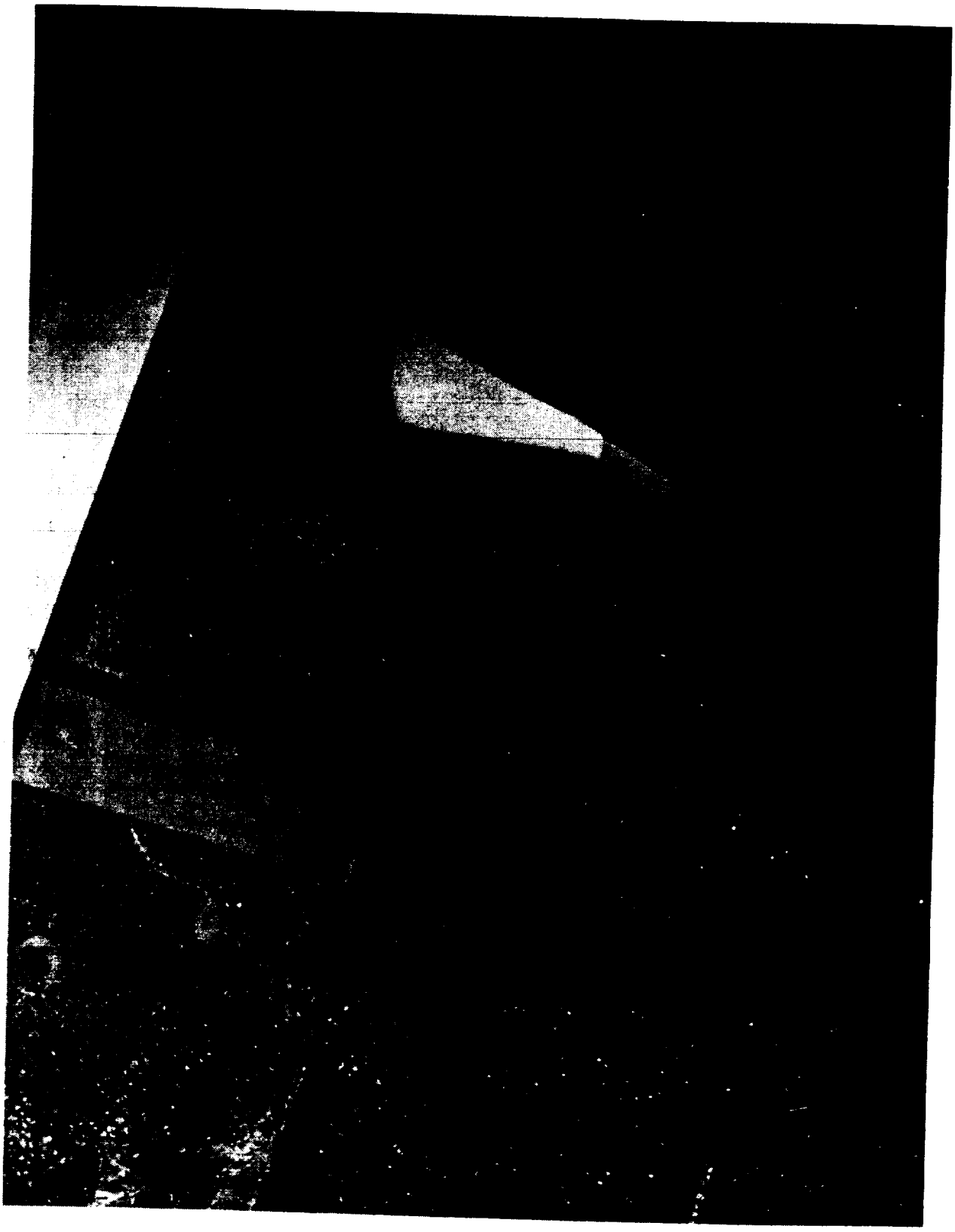
The two NASA employees were killed in commercial airplane crashes. One was a NASA employee from JSC on loan to the New Mexico State University. The other was on official travel from MSFC.

There does not appear to be any immediate, direct action NASA can take to prevent these types of accidents.

NASA TYPE "A" ACCIDENTS - 1977

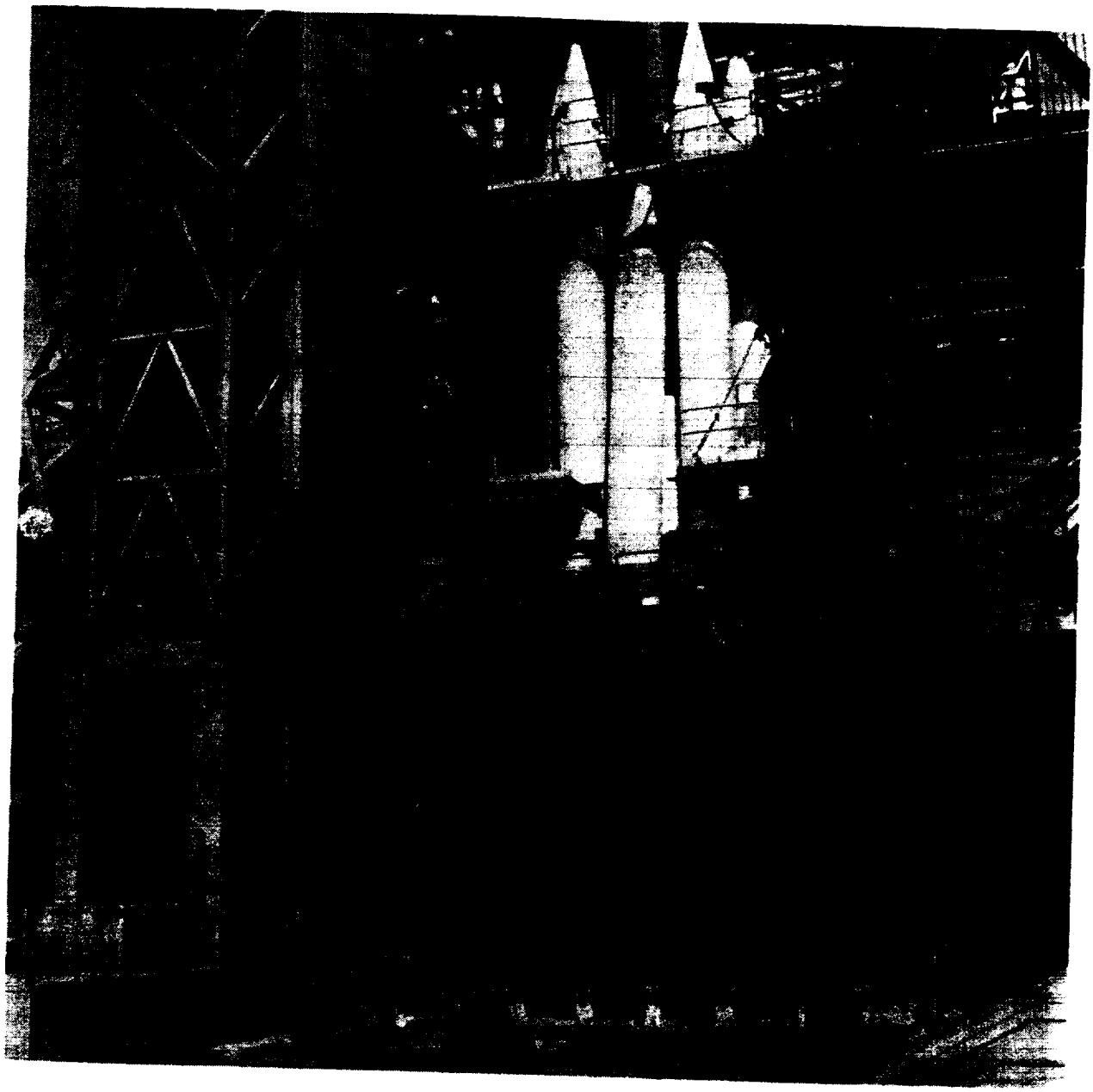
LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
Downey, CA	1-8-77	NASA contractor employee ran in front of company truck on U.S. Government property and was killed.	Raining and dark and probably inattention of employee.		Better attention on part of employee.
Madrid, Spain	3-9-77	Contractor employee in leased vehicle ran off road, hit stone fence on left, crossed road, hit fence on right; killed.	Driver failed to maintain control of vehicle; speed may have been involved.		Driver training.
NSTL Test Stand A-1 Test Ops	3-24-77	Fire on A-1 Test Stand during testing of SSME S/N 0003.	Not conclusive: Seal leaks with turbine rubbing. Excessive heat, materials ignition in oxygen, H_2 & O_2 fire.	$3.3 million	Modify designs to reduce possibility of repeat failures. Change fire system operation to be more responsive.
MSFC	4-4-77	Employee killed in commercial airplane crash.	Engine failure in weather conditions.		
KSC Mission Failure	4-20-77	Delta (ESRO-GEOS) failed to reach geosynchronous orbit.	Premature separation of second and third stages.	$16 million reimbursable	Redesign clamp band assembly.

Results of Test Stand Fire with LOX and LH_2



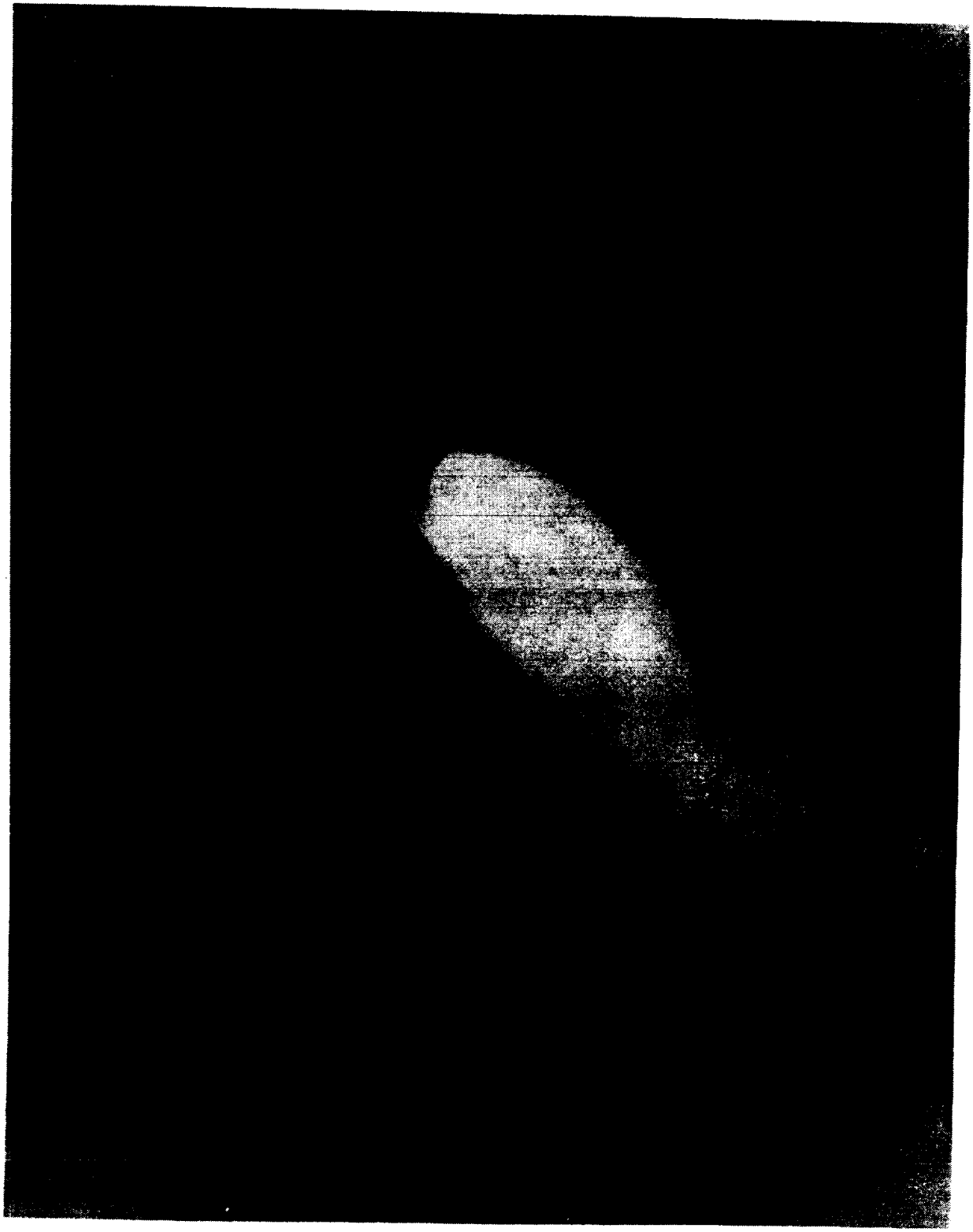
Broken 5/16" deck plate and cracked stiffeners from LOX Barge No. 2 after LOX transfer accident.

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
KSC	5-18-77	Castor IV solid motor on Delta dropped 12 feet, punctured booster.	Overheating stud on attachment clamp during machining. Stress corrosion, improper plating.	Included in 9-13-77 OTS failure.	Better manufacture controls and better controls at installation.
NSTL	8-8-77	Lox Barge No. 2 damaged due to leak during attempted transfer.	Flange gasket failed during rapid chill procedure.	$175,000 - $325,000	Change flange design and torquing procedures.
JSC	8-11-77	Employee on loan to NMSU killed in chartered airplane crash.	Unknown.		
WFC	8-13-77	Civilian killed while riding motorcycle--struck curb and light pole.	Failed to maintain control of motorcycle; struck pole and ground.		
KSC	8-14-77	Tug capsized and sunk. One contractor crew member killed.	Unknown--possible fouling of tug with tow lines.	Unknown	Being investigated.
NSTL Test Stand A-1 Test Ops.	9-8-77	Fire on A-1 Test Stand during testing of SSME 0004.	Bearing failure in high-pressure liquid oxygen turbopump.	$2.4 million	Modify design to prevent load imbalance on bearings.

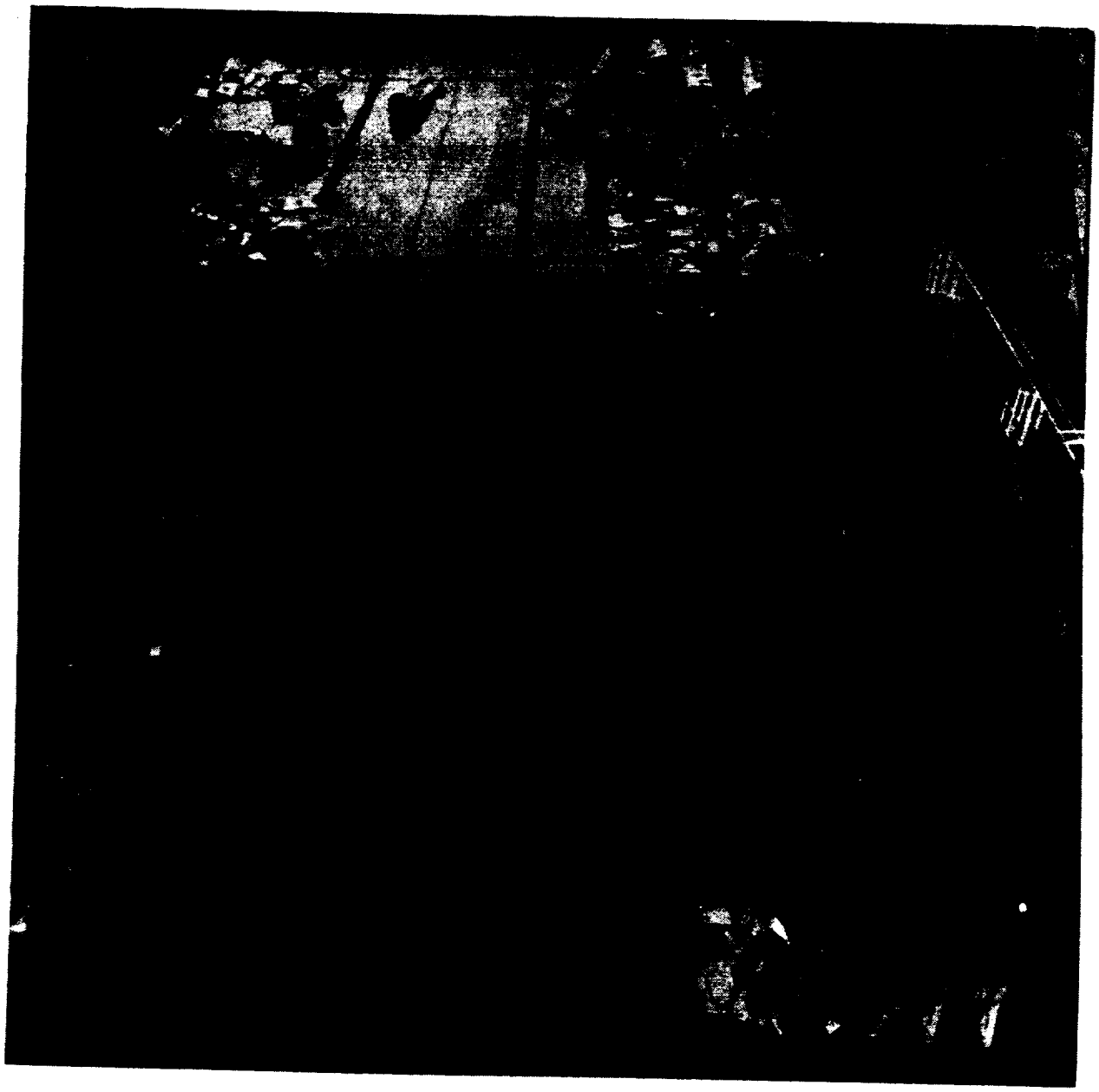


Results of Solid Motor fastener failure

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
KSC Mission Failure	9-13-77	ESA-OTS Delta launch vehicle failed in flight.	Burnthrough of solid motor case from inside.	$16 million	Review and implement recommendations of Review Board.
KSC Mission Failure	9-29-77	Intelsat IVA Atlas-Centaur malfunctioned--no orbit.	High pressure joint failed.	$28.5 million reimbursable	Better control of manufacturing process.



Delta 134 Mission Failure-- Solid Motor Burnthrough



Recovered Parts of Delta 134 After In-Flight Failure

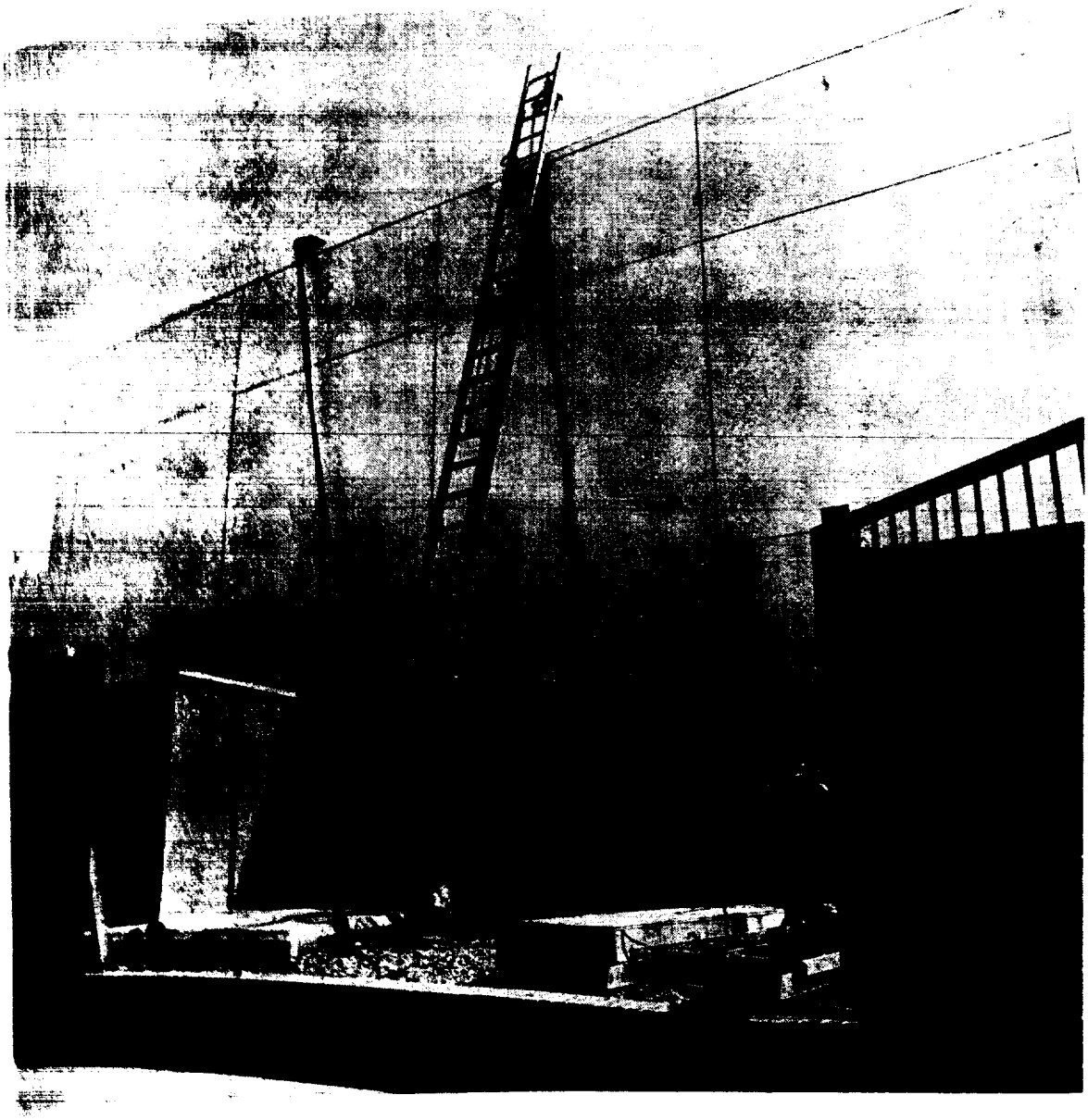
NASA TYPE "B" ACCIDENTS - 1977

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
KSC	2 -2-77	Contractor employee lost sight one eye when power assist hammer fell to floor, discharged, fragment hit eye.	No eye protection, no safety device to prevent discharge, premature loading.	1 eye	Eye protection, safety device, delay loading
HQ	3-21-77	Employee (diabetic) received burns on foot while receiving heat treatment for sore foot.	Poor circulation in foot.	Several days in hospital and lost time.	Lower temperature and special precautions for diabetics or others with poor circulation.
Goldstone*	3-25-77	GSA car struck from behind and pushed into car in front. Six individuals sent to hospital for x-rays, then released.	Inattention, light snow, wet road.	$1,289	Attention to driving.
GSFC	4-6-77	Contractor fell from ladder; received scalp laceration, concussion, broken ribs and vertebrae.	Using improper method for taking materials to roof, using wrong ladder, brief lapse of consciousness.		Use proper equipment and procedures. Better supervision.

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
JSC	6-6-77	Contractor sprayed herbicide around occupied buildings near air-conditioning, caused eye and respiratory irritation to 4 employees.	Contractor failed to follow		Monitor contractor efforts closer.
JPL*	6-28-77	Overheated wires [illegible] circuit-fire-type insulation and paint burned.	[illegible] overheated wires.	$15K	Better equipment protection, especially when operating unattended.
WFC	8-16-77	MLS transformer and perimeter fence destroyed.	Subcontractor employees in POV drove down runway.	$13,000 (Reimbursed by insurance)	
GSFC	9-1-77	Employee received third-degree burns and in semi-shock.	Touched 13,000 volt energized system.		Use "red-tag" (lockout) procedures when involved with potentially hazardous activities.
ARC*	9-2-77	During ground tie-down test at Arlington, Texas, cabin door opened, was struck and damaged. Also, rotor blade damaged.	Door opened while aircraft was changing to helicopter mode; door was struck.	$75,000 (No cost to NASA)	Being determined during investigation.

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
GSFC	9-8-77	Employee amputated parts of two fingers with radial arm saw.	Employee used improper equipment to cut tile.		Use proper equipment.

*These mishaps are not included in the tables.



Unsecured ladder being used by contractor to carry materials to roof of building.

Note unsecured ladder, no nonskid pads, and five gallon can of cement apparently being carried by contractor employee before he fell and was injured.

SIGNIFICANT NASA INCIDENTS - 1977

DATE	DESCRIPTION	CAUSE	COST	RECOMMENDATIONS
1-21-77	Airplane propeller and fairing research test failure.	Add-on shroud not reviewed by specialists. Design inadequate for operating conditions.	$1,700	Be sure new designs and add-on are reviewed carefully and see that dynamic models are properly reviewed.
3-14-77	T-28 aircraft landed wheels up.	Pilot forgot to put wheels down.	$9,400	Have qualified check pilot during training and orientation. Follow checklist.
8-18-77	Air dryer failure.	Over-temperature control failed.	$4,250	
9-2-77	Implosion of test section windows.	Improperly stressed glass.	$2,000	Over design or take some risk during changes.
9-10-77	Computer fire	Probably power surge from lightning strike.	$8,000 Replacement	Install adequate lightning arresters.
11-23-77	Methane gas trailer separated from tractor.	Latch malfunctioned	$350	Better or more frequent operational checks.

SAFETY AND ENVIRONMENTAL HEALTH SURVEYS
1977

The NASA Headquarters Safety and Environmental Health Division conducted surveys at five field installations during the 1977 calendar year:

Kennedy Space Center	January 10-14, 1977
Langley Research Center	March 21-25, 1977
Johnson Space Center	June 6-10, 1977
Wallops Flight Center	August 15-19, 1977
Marshall Space Flight Ctr.	Oct. 31-Nov. 4, 1977

Due to travel fund limitations and the marginal manpower available in 1976, NASA HQ initiated a Safety and Environmental Health survey schedule of visiting each Field Installation biennially in lieu of annually. To compensate for this change in scheduling, the field centers are now conducting self-surveys on the off-year. The field center survey teams are to be made up of third party members to negate the possibility of conducting a partisan review. To date, the results of the field center self-survey program have been very encouraging both in their comprehensive planning and productiveness.

The quality of surveys conducted by the NASA Safety and Environmental Health and Program Assurance Divisions is reflected by the general acceptance at the installations. The receptive attitude and support expressed by the Center Directors and Staffs is indicative of the professional manner the general survey program is conducted and of its continuing worth in contributing to the upgrading of installation performance.

OCCUPATIONAL ILLNESSES

A total of 14 occupational illnesses were reported during 1977. Eight of these were non-lost time illnesses. The six lost time illnesses reported resulted in 23 lost work days.

NASA has a fairly comprehensive occupational health program which is geared to the control of health hazards in the work place and thus to the prevention of occupational disease. The low number of reported occupational illnesses is due in part to the various preventive activities associated with this program. However, these figures may not be indicative of the true incidence, since it is quite well known that many illnesses have an occupational origin but are never recognized or reported.

If good statistics relative to the incidence of occupational illnesses are to be available, a concerted effort must be made to gather pertinent data. Most illnesses with an occupational origin do not show up immediately following exposure to a health stress or hazard and in some cases 20 to 30 years or more elapse before symptoms of the disease are manifest. Therefore, accurate records relative to employee work and exposure histories must be obtained and kept up-to-date for extended periods of time. Health standards being proposed by OSHA address this area of concern.

NASA PERSONNEL INJURIES FOR 1977

For the eighth year in a row NASA has been faced with the anomaly of fewer and fewer employees having more and more lost time injuries. As is mentioned in the 1976 report, a NASA Headquarters contracted study in the field of loss control indicated that the four-year old, 45-day continuation of pay law (CoP), which permits a government employee injured on the job to remain away from work without charge to either sick or annual leave, is subject to abuse. Tightening of supervisory and occupational medicine procedures is necessary if we are to bring down the lost time injury rate and prevent abuse of a needed law.

The NASA injury frequency went up again in 1977. In 1976, there were three NASA facilities which attained the "Safety '76" goal of 0.20 injuries per 200,000 man-hours worked; this year kudos go only to MAF for having reached that goal. (It is likely that NSTL would have also been in this category; however, a report was not submitted for inclusion in the statistics.) The remaining installations have driven the injury frequency rate to a new all-time high of 0.83. The following installations, however, did reduce their frequency rates during 1977: ARC, GSFC, LaRC, MSFC, and WFC. We commend them for their improvements.

Six centers (ARC, GSFC, JSC, LaRC, LeRC, and MSFC) submitted complete Form 345s and one center submitted a 345 with total injury cases but without lost-time cases (not included in the summary form enclosed). The lost-time cases indicated here are within three or four of those reported on the 102F, but the total cases are approximately double those listed on the 102F. This may indicate the difference between reportable cases and first aid cases. Section VII: Type Of Injury, lists 836 or nearly 2.6 times as many injuries as reported on the 102F and 1.2 times as many types of injuries as the number of injuries listed in the other sections of the report. This perhaps indicates multiple types of injuries in some instances.

Again, as in years past, the message from all of this is that while slips, trips, and falls will always be with us, top managers can and should exercise more direct supervision of day-by-day working conditions and more fully investigate each injury and take action to prevent recurrences and potential abuse of continuation of pay and Federal Employee Compensation procedures.

ACCIDENT CAUSE ANALYSIS REPORT

Report No./Year (Calendar) 1977

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION I. SHIFT					
a.					
b.					
c.					
SECTION II. PART OF BODY INJURED					
a. Head					3/33
b. Eye					5/55
c. Face					3/11
d. Arm					7/44
e. Hand					[illegible]/61
f. Fingers					10/143
g. Torso					10/24
h. Back					48/101
i. Chest					4/20
j. Abdomen					0/11
k. Leg					22/77
l. Foot					12/36
m. Toe					10/9
n. Other					11/62
SECTION III. AGENCY INVOLVED					
a. Animals					0/2
b. Boilers and Pressure Vessels					[illegible]/3
c. Chemicals					[illegible]
d. Conveyors					0/1
e. Dusts					[illegible]
f. Electrical Apparatus					[illegible]/18
g. [illegible]					[illegible]/4
h. [illegible]					[illegible]/66
i. [illegible]					[illegible]/5
j. [illegible]					[illegible]
k. Machines					[illegible]/31
l. Material Handling					[illegible]/133
m. Mechanical Power Transmission Apparatus					2/4
n. Prime Movers and Pumps					1/4
o. Radiation and Radiating Substances					0/0
p. Vehicles					13/43
q. Walking Surfaces					49/150
r. Agencies not elsewhere classified					[illegible]/180
SECTION IV. TYPE OF ACCIDENT					
a. Striking Against					18/137
b. Struck By					13/105
c. Caught in, on or between					6/47
d. Fall on same level					16/60
e. Fall to different level					12/34
f. Slip (not fall) or overexertion					53/135
g. Exposure to temperature extremes					0/11
h. Contact with electric current					2/3
i. Inhalation, absorption, swallowing					5/21
j. Electric welding flash					1/2
k. Foreign body in eye					5/36
l. Type of accident not elsewhere classified					27/98

NASA FORM 345 (REV. APRIL 66) Previous Editions Are Obsolete.

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION V: UNSAFE MECHANICAL CONDITION					
a. Improper Guarding					7/64
b. Defective Substances or Equipment					8/30
c. Hazardous Arrangement					33/127
d. Improper Illumination					0/0
e. Improper Ventilation					1/15
f. Unsafe Clothing					3/6
g. No unsafe condition					90/365
h. Unsafe condition not elsewhere classified					14/70
Other					2/11
SECTION VI: UNSAFE ACT					
a. Operating without authority					0/3
b. Operating or working at unsafe speed					9/15
c. Making safety devices inoperative					1/0
d. Using unsafe equip/hands instead of equip/equip unsafely					9/22
e. Unsafe loading, placing, mixing, etc.					22/36
f. Taking unsafe position or posture					37/196
g. Working or moving on dangerous equipment					5/9
h. Distraction, teasing, abusing, startling, etc.					12/43
i. Failure to use safe attire or gers, protective devices					11/57
j. No unsafe acts					34/245
k. Unsafe act not elsewhere classified					18/62
SECTION VII: TYPE OF INJURY					
a. Abrasion					2/41
b. Amputation					1/6
c. Burn, Chemical/Cryogenic					0/6
d. Burn, Thermal					3/16
e. Contusion					24/115
f. Dermatosis					0/4
g. Foreign Body					4/23
h. [illegible]					17/27
i. [illegible]					12/103
j. Puncture					0/26
k. Sprain or Strain					86/219
l. Toxicological					6/30
Other					4/39
SECTION VIII: NO. LOST TIME INJURIES					
Total					
SECTION IX: REMARKS					

25 — Denotes injury cases only
5/25 — Top number denotes lost-time injury cases
Bottom number denotes injury cases.

PREPARED BY:

SUBMITTED BY

GPO 906-670

1977 NASA INJURY FREQUENCY RATE
NUMBER OF DISABLING (LOST TIME) INJURIES
PER 200,000 MAN-HOURS WORKED

	1977	AVERAGE OF 1969-1977
AMES RESEARCH CENTER	.97	.60
DRYDEN FLIGHT RESEARCH CENTER	.57	.36
GODDARD SPACE FLIGHT CENTER	1.21	.55
JOHNSON SPACE CENTER	.36	.32
KENNEDY SPACE CENTER	.55	.34
LANGLEY RESEARCH CENTER	1.20	.71
LEWIS RESEARCH CENTER	1.52	.65
MARSHALL SPACE FLIGHT CENTER	.40	.33
MICHOUD ASSEMBLY FACILITY	0	Not Available
NATIONAL SPACE TECH. LAB.	Not Available	Not Available
WALLOPS FLIGHT CENTER	.23	.24
HEADQUARTERS	.71	.20
NASA (TOTAL)	.83	.45

NASA HQ D676-3078 (1)
Rev. 6-29-78

NASA INJURIES AND ILLNESSES BY INSTALLATIONS 1977

	NO. OF EMPLOYEES	MAN HOURS WORKED IN K	TOTAL INJURY ILLNESS	NO. LOST WORKDAY CASES	NO. OF LOST WORKDAYS	INJURY FREQUENCY RATE THIS YEAR	INJURY FREQUENCY RATE LAST YEAR	INJURY SEVERITY RATE	AUTO MISHAP FREQ. RATE GOV	AUTO MISHAP FREQ. RATE POV	NO. OF OTHER MISHAPS	OTHER MISHAPS LOSS ($K)	AIRCRAFT MISHAP FREQ. RATE	NO. OF FIRES	FIRE LOSS ($K)	TOTAL COST MISHAPS ($K)	MISHAP COST RATE ($K)
ARC	1,696	3,287	33	16	147	.97	1.01	8.94	3.81	0	0	0	0	6	.60	3.3	1.00
DFRC	584	1,053	12	3	39	.57	.40	7.41	0	0	0	0	0	0	0	0	0
GSFC	3,753	7,129	50	43	929	1.21	1.26	26.06	7.07	0	2	28.0	0	2	2.30	41.4	5.80
HQ	1,673	3,120	37	11	134	.71	.26	8.59	0	0	0	0	0	0	0	0	0
JSC	3,915	7,784	20	14	6090	.36	.12	156.47*	0	0	3	2.35	18.91	11	.55	10.0	1.29
KSC	2,317	4,028	18	11	116	.55	.32	5.76	9.86	2.58	1	.75	0	2	.51	4.0	.99
LaRC	3,288	5,824	69	35	383	1.20	1.51	13.15	0	0	9	24.40	96.06	0	0	34.6	5.95
LeRC	3,050	5,514	124	42	446	1.52	1.22	16.18	22.21	0	0	0	0	1	.27	2.3	.41
MAF	30	50	0	0	0	0	0	0	0	0	0	0	0	2	2.40	2.4	47.58
MSFC	4,201	7,418	31	15	6487	.40	.45	174.90*	.98	0	0	0	0	0	0	1.1	.15
NSTL	83	146	NO REPORT RECEIVED FROM NSTL FOR CALENDAR YEAR 1977														
WFC	425	874	33	1	6	.23	.25	1.37	1.5	0	0	0	0	0	0	1.6	1.84
TOTAL	25,015	46,227	427	191	14,777	.83	.77	63.93	5.28	.52	15	55.50	13.88	21	6.63	100.7	2.18
LAST YEAR	25,794	45,668	486	175	2,968	.77		13.0	8.3	.3	103	691.0	4.67	37	20.2	742.4	16.26

* Severity Rate for JSC would have been 2.31, and for MSFC would have been 13.13 if an employee from each had not been killed in commercial airplane crashes while on duty. The JSC employee was on loan to New Mexico State University and the MSFC employee was on official travel.

1/ INJURY FREQUENCY RATE = NO. OF LOST WORKDAY CASES PER 200,000 MAN-HOURS WORKED

2/ INJURY SEVERITY RATE = NO. OF LOST WORKDAYS PER 200,000 MAN-HOURS WORKED

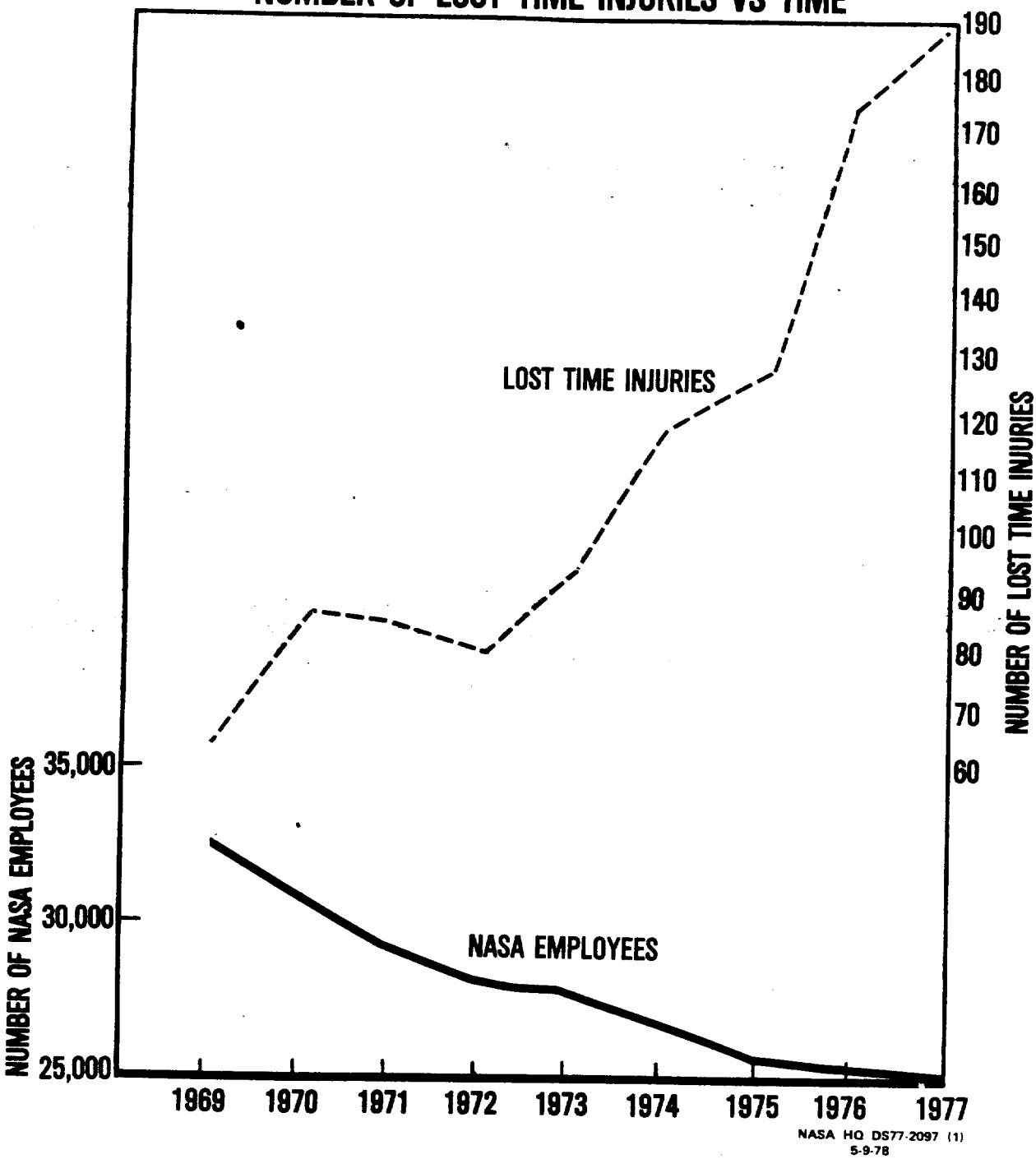
3/ AIRCRAFT MISHAP FREQUENCY RATE = NO. OF MISHAPS PER 100,000 HOURS FLOWN

4/ MOTOR VEHICLE MISHAP FREQUENCY RATE = NO. OF MISHAPS PER MILLION MILES DRIVEN

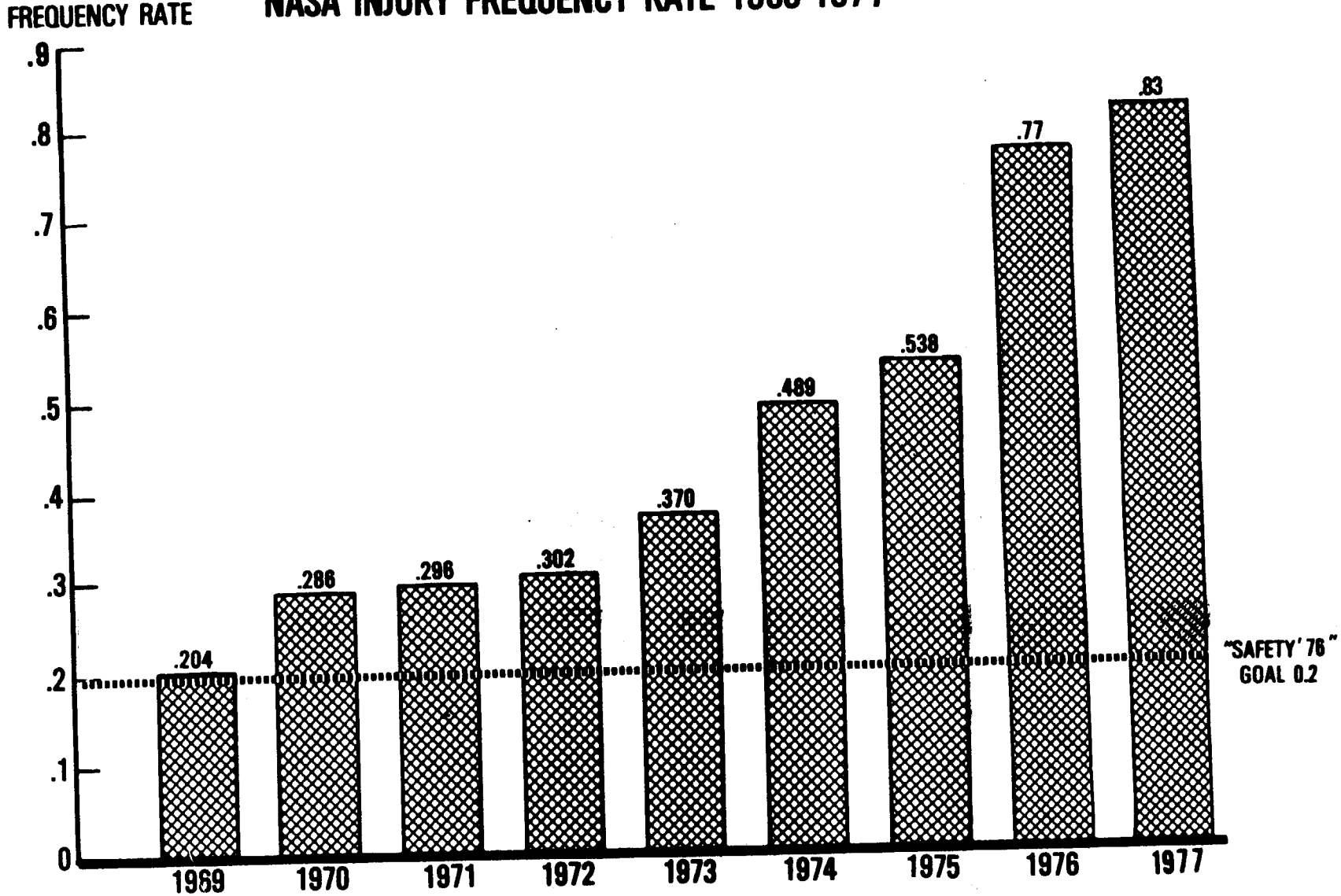
5/ TOTAL COST OF MISHAPS INCLUDES REPAIRS/REPLACEMENT OF MOTOR VEHICLES AND AIRCRAFT, OTHER THAN VEHICLE DAMAGE, AND TORT CLAIMS (AS ON OSHA FORM 102FF)

6/ MISHAP COST RATE = TOTAL COST OF MISHAPS PER MILLION MAN-HOURS WORKED

NUMBER OF NASA EMPLOYEES AND NUMBER OF LOST TIME INJURIES VS TIME



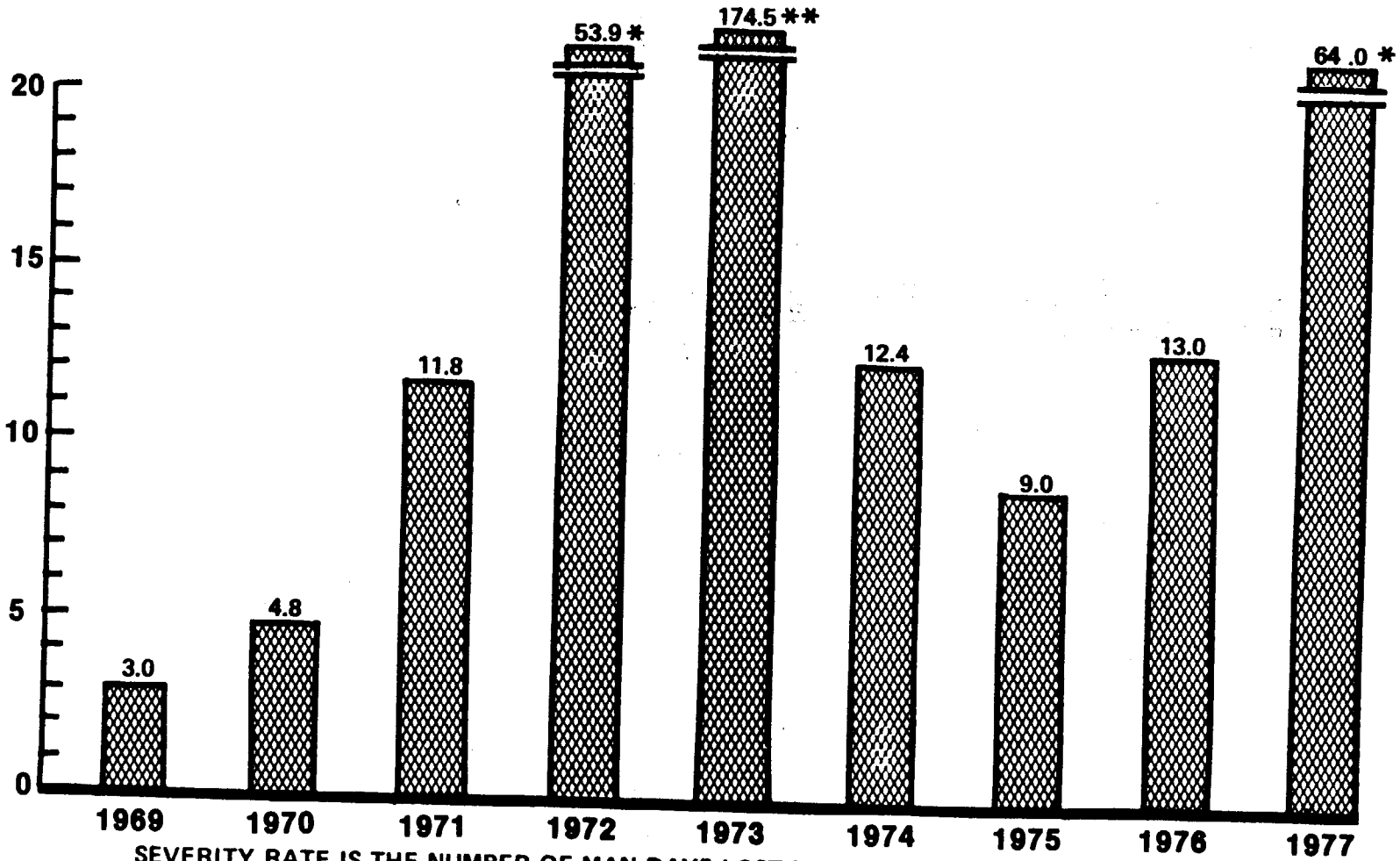
NASA INJURY FREQUENCY RATE 1969-1977



FREQUENCY RATE IS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED.

NASA HQ D577-2066 (1)
Rev. 6-29-78

NASA INJURY SEVERITY RATE



SEVERITY RATE IS THE NUMBER OF MAN DAYS LOST MULTIPLIED BY 200,000, DIVIDED BY THE TOTAL MAN HOURS WORKED.

NASA HQ DS77-3181 (1)
5-9-78

* TWO FATALITIES, EACH CHARGED AS 6,000 WORK DAYS

** SEVEN FATALITIES.
TWO FATALITIES IN 1977 OCCURRED IN COMMERCIAL AIRPLANE CRASHES

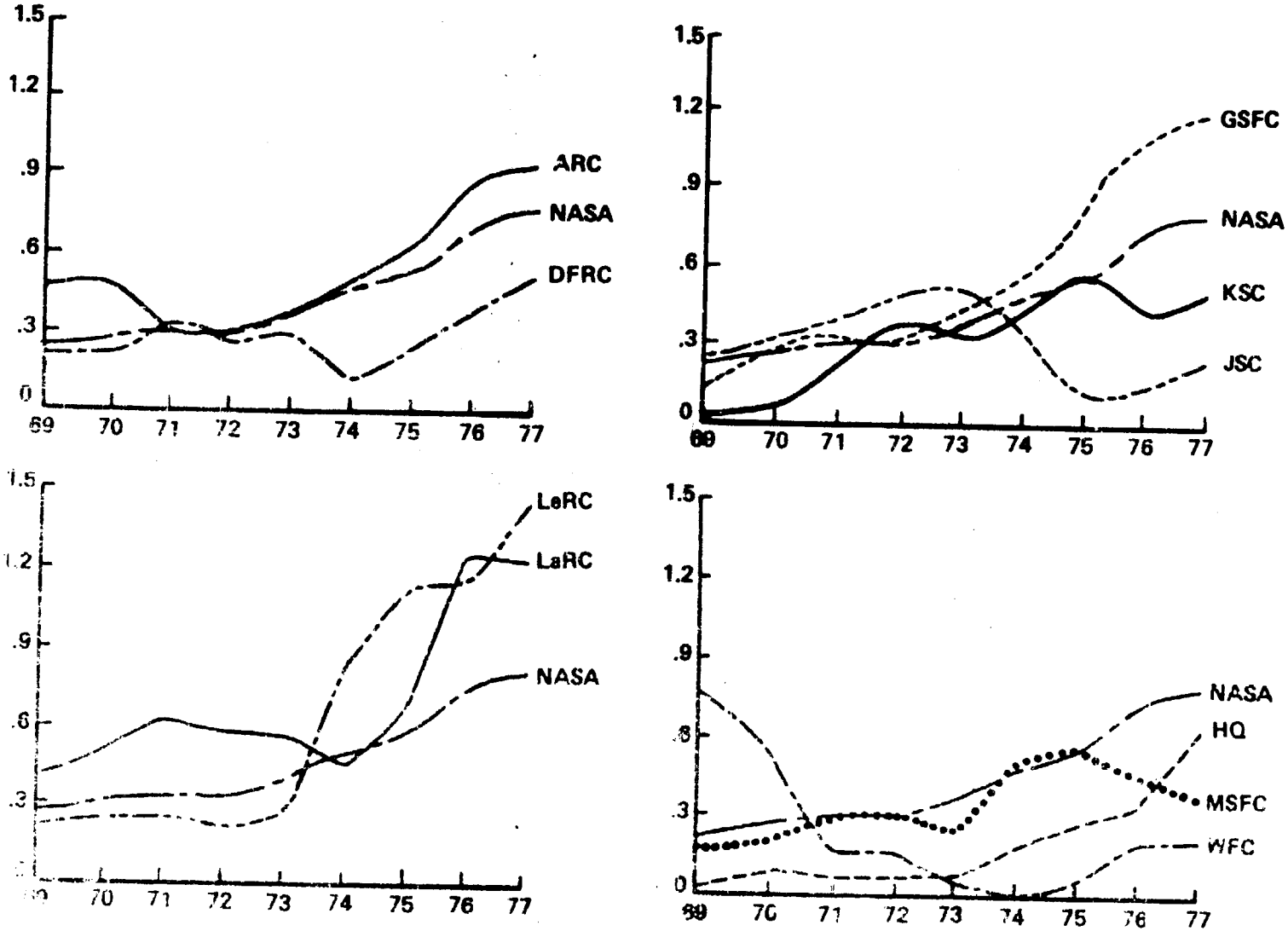
AUTOCORRELATED INJURY FREQUENCY AND SEVERITY RATES FOR NASA IN 1977

The autocorrelated injury frequency data for all NASA and those centers which had sufficient data for the period 1969 - 1977 are shown in the following charts. These figures indicate the trends during this period, and, in general, the trend is toward higher frequencies.

The related severity rates are also increasing as shown in the charts. The increases have been quite pronounced since 1973. One can assume that this significant increase is related to the Continuation of Pay (CoP) changes in the law. Also, during this same period, there has been an increased willingness for physicians to suggest to injured personnel that staying home a few days or a week would be more comfortable than going to work. The net result seems to be a tendency for employees to stay away from the job more often and for longer periods. There is no particular reason to assume that total injuries are more frequent or more severe than in the past.

The correlation procedure used to produce these charts is a smoothing technique which takes some of the randomness out of the data and yet preserves the form or pattern for the period being considered. Depending on the autocorrelation coefficient chosen, the program can retain the fine structure of the data or smooth the curve to show only the trends. A correlation coefficient of 0.5 was used for these curves; so the general form is retained, the trend is shown, and the extreme variations are smoothed.

INJURY FREQUENCY RATES 1969-1977 AUTOCORRELATED

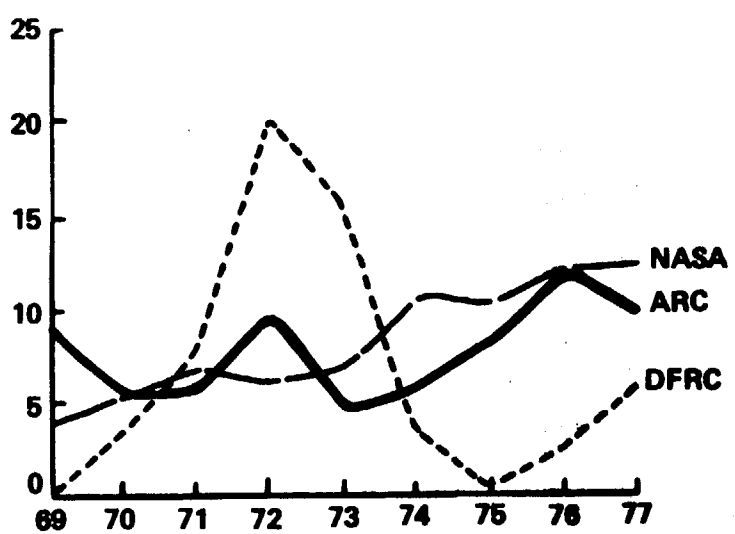


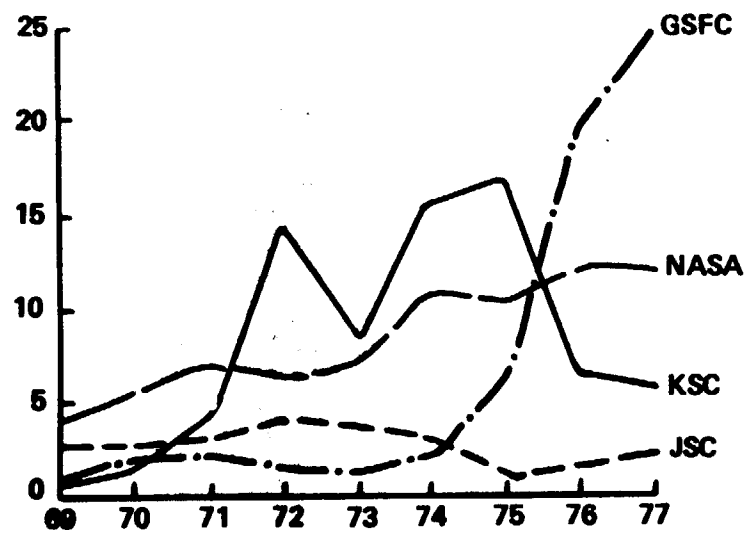
FREQUENCY RATE IS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED

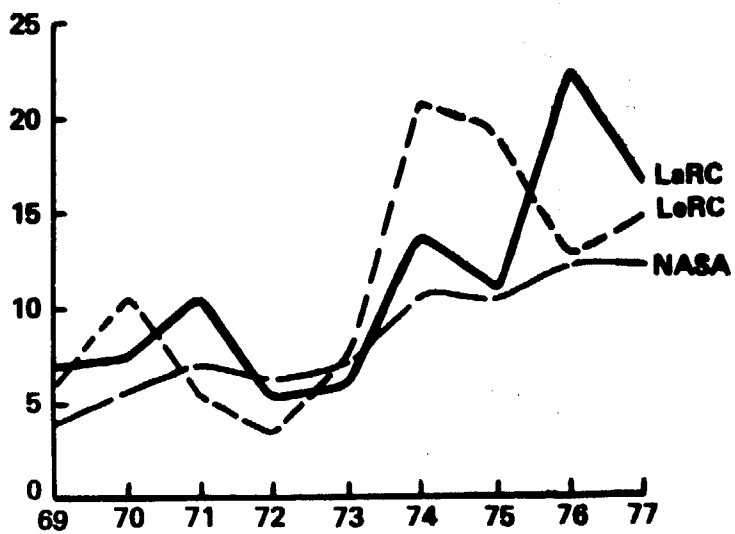
CORRELATION FACTOR = 0.5

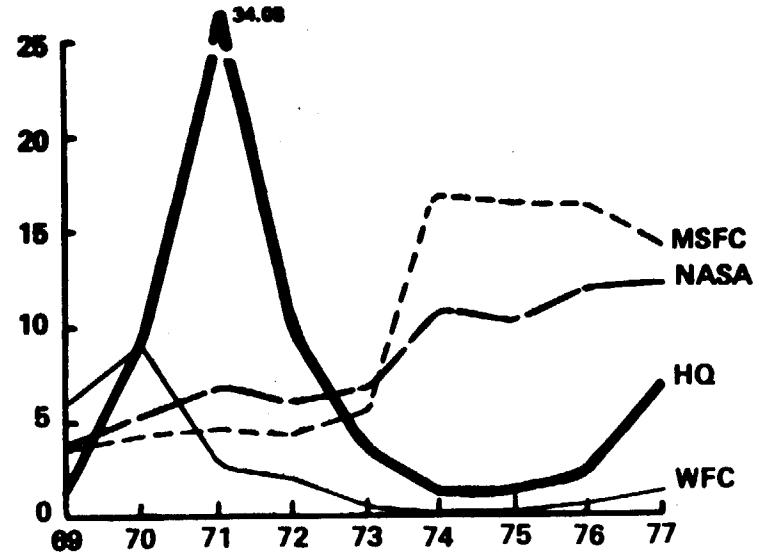
NASA HQ DS773168 (1)
5-15-78

INJURY SEVERITY RATES 1969-1977 AUTOCORRELATED









SEVERITY RATE IS THE NUMBER OF MAN-DAYS LOST BY ACCIDENT PER MILLION MAN-HOURS WORKED

NASA HQ DS77-3167-(1)
5-15-78

STATISTICAL CHANCE OF BEING INJURED IN NASA ON-THE-JOB IN 1977 VS 1976

	TOTAL OF LOST AND NON-LOST TIME INJURIES	AVERAGE NUMBER OF EMPLOYEES	CHANCES OF BEING INJURED IN 1976	CHANCES OF BEING INJURED IN 1977
MAF	0	30	0	0
JSC	20	3,915	1 IN 360.1	1 IN 195.8
MSFC	31	4,201	1 IN 119.2	1 IN 135.5
KSC	18	2,317	1 IN 182.8	1 IN 128.7
GSFC	50	3,753	1 IN 78.2	1 IN 75.1
ARC	33	1,666	1 IN 48.9	1 IN 51.4
DFRC	12	584	1 IN 96.5	1 IN 48.7
LARC	68	3,288	1 IN 20.4	1 IN 47.7
HQ	37	1,673	1 IN 222.1	1 IN 45.2
LERC	124	3,050	1 IN 23.0	1 IN 24.6
WFC	33	425	1 IN 19.1	1 IN 12.9
NSTL	NO REPORT SUBMITTED IN 1977		0	—
NASA (TOTAL)	427	25,015	1 IN 53.7	1 IN 58.6

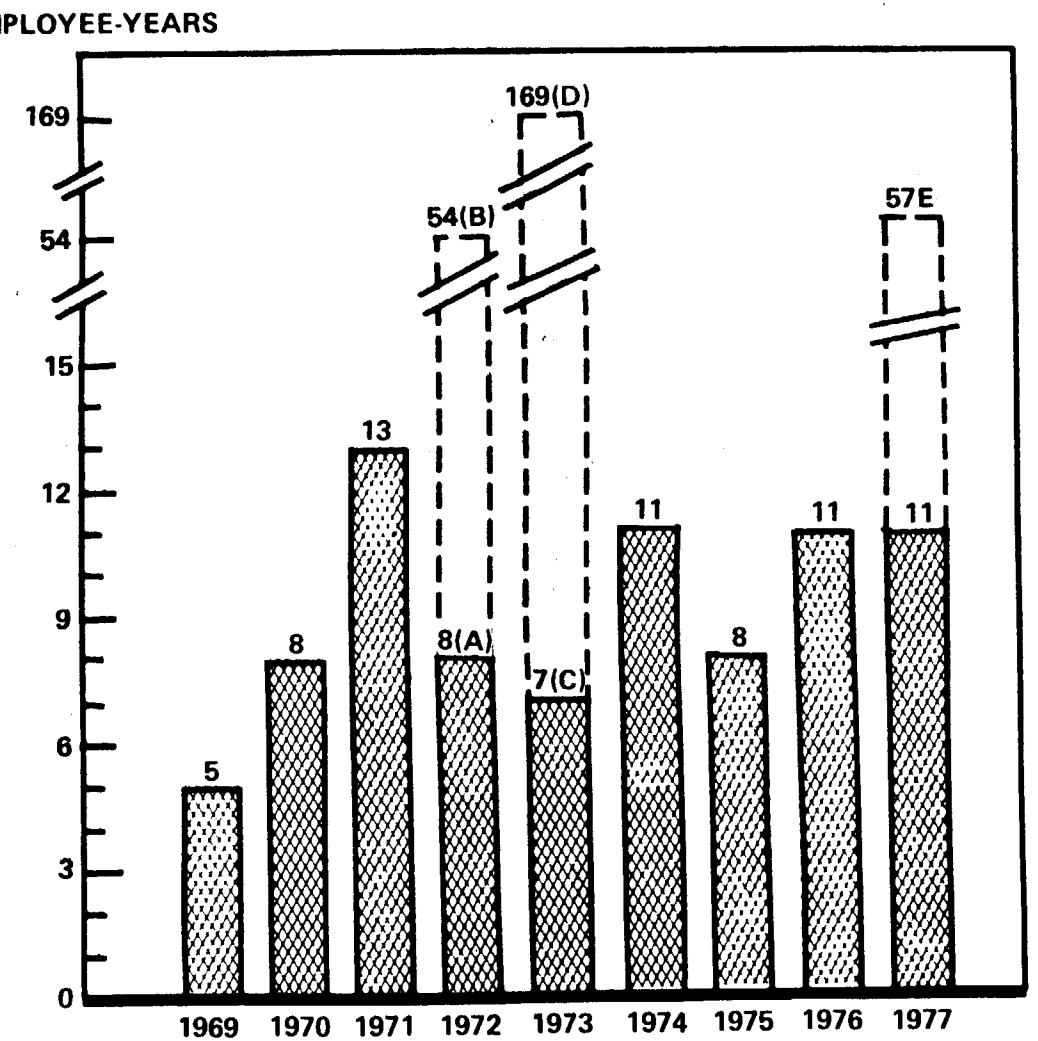
NASA HQ D877-2086 (1)
Rev. 6-28-78

NASA EMPLOYEE-YEARS LOST DUE TO ON-THE-JOB INJURIES *

NOTES:

(A) 1972 DATA EXCLUDING THE 2 FATALITIES
(B) 1972 DATA INCLUDING THE 2 FATALITIES
(C) 1973 DATA EXCLUDING THE 7 FATALITIES
(D) 1973 DATA INCLUDING THE 7 FATALITIES
(E) 1977 DATA INCLUDING THE 2 FATALITIES (BOTH IN COMMERCIAL AIRCRAFT CRASHES)

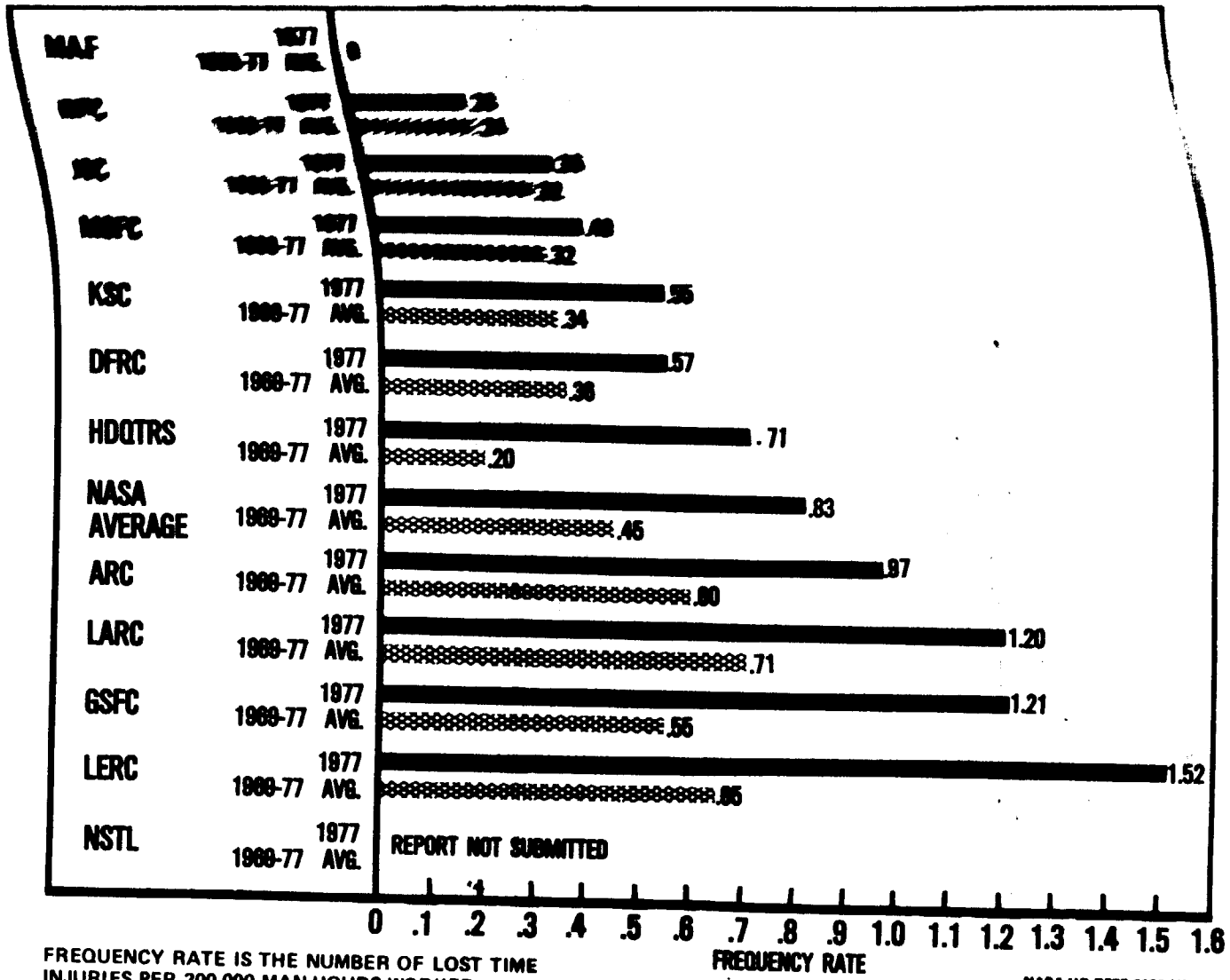
* 260 WORK DAYS - 1 EMPLOYEE-YEAR
EACH FATALITY CAUSES LOSS OF 6,000 WORK DAYS



NASA HQ DS78-2288 (1)
5-9-78

NASA INJURY FREQUENCY RATES

(LOST TIME)



FREQUENCY RATE IS THE NUMBER OF LOST TIME INJURIES PER 200,000 MAN-HOURS WORKED .

NASA HQ 0877-2086 (1)
Rev. 6-29-78

NASA AVIATION ACCIDENT/INCIDENT EXPERIENCE IN 1977

The NASA aviators and ground support personnel in 1977 were "great," but there were a few problems. There were no fatalities or Type "A" or "B" accidents. There were three incidents: A deer strike during the landing roll, a wheels up landing, and a towing incident on the ramp. A contractor had a Type "B" accident which occurred on the test stand when a door opened and was damaged, and a blade tip was also damaged. The contractor cost for the Type "B" accident was $75,000, and the three incidents cost less than $12,000.

It is difficult to avoid the deer strike types of mishaps but the other three mishaps were avoidable. Wheels up landings are not only embarassing, but have the potential of being expensive. Towing should be at speeds slow enough and normally with sufficient control over the environment to avoid striking other objects or buildings. Operations on test stands, as the contractor was doing, should provide a controlled environment, but perhaps this is part of the problem. Since the aircraft is not intended to fly away, perhaps sufficient care is not exercised, in all instances, to avoid risks such as securing doors or moving around or in and out of the test vehicle.

Although there were four reported mishaps, the costs were relatively small, and there were no personnel injuries or deaths. Let us learn from this year's experiences and avoid the avoidable. One injury report involved a fall from a parked aircraft. This injury should have been prevented; because it was foreseen and noted as a survey inspection action at an earlier date.

In the past decade, aviation accidents have been significant contributors to the total NASA loss. In the past four years, this loss has been dramatically reduced. Now is the time to watch for complacency. Remember aviation's definition ". . . hours and hours of boredom interrupted by a few moments of stark terror."

The accident rates are based on flight accidents per 100,000 hours flown. The LLTV and V/STOL mishaps of 1969 and 1971 were not included, as the flying hour base and exposure comparison would not produce a meaningful rate figure. The overall NASA rate could be compared to a military fighter trainer/test aircraft rate which normally may range from 6 to 15. The administrative aircaft rate has remained essentially zero except for one Type "B", Queenaire, accident in 1969.

NASA
L-77-2140

Wheels up landing

AVIATION MISHAPS
1969-1977

	1969	1970	1971	1972	1973	1974	1975	1976	1977
TYPE A	5	0	2	2	2	1	0	0	0
TYPE B	0	0	0	1	2	1	1	0	0
INCIDENTS	2	5	6	2	10	3	2	0	3
AIRCRAFT DESTROYED	4	0	2	2	2	1	0	0	0
PILOT/CREW FATALITIES	0	0	0	2	11	0	0	0	0

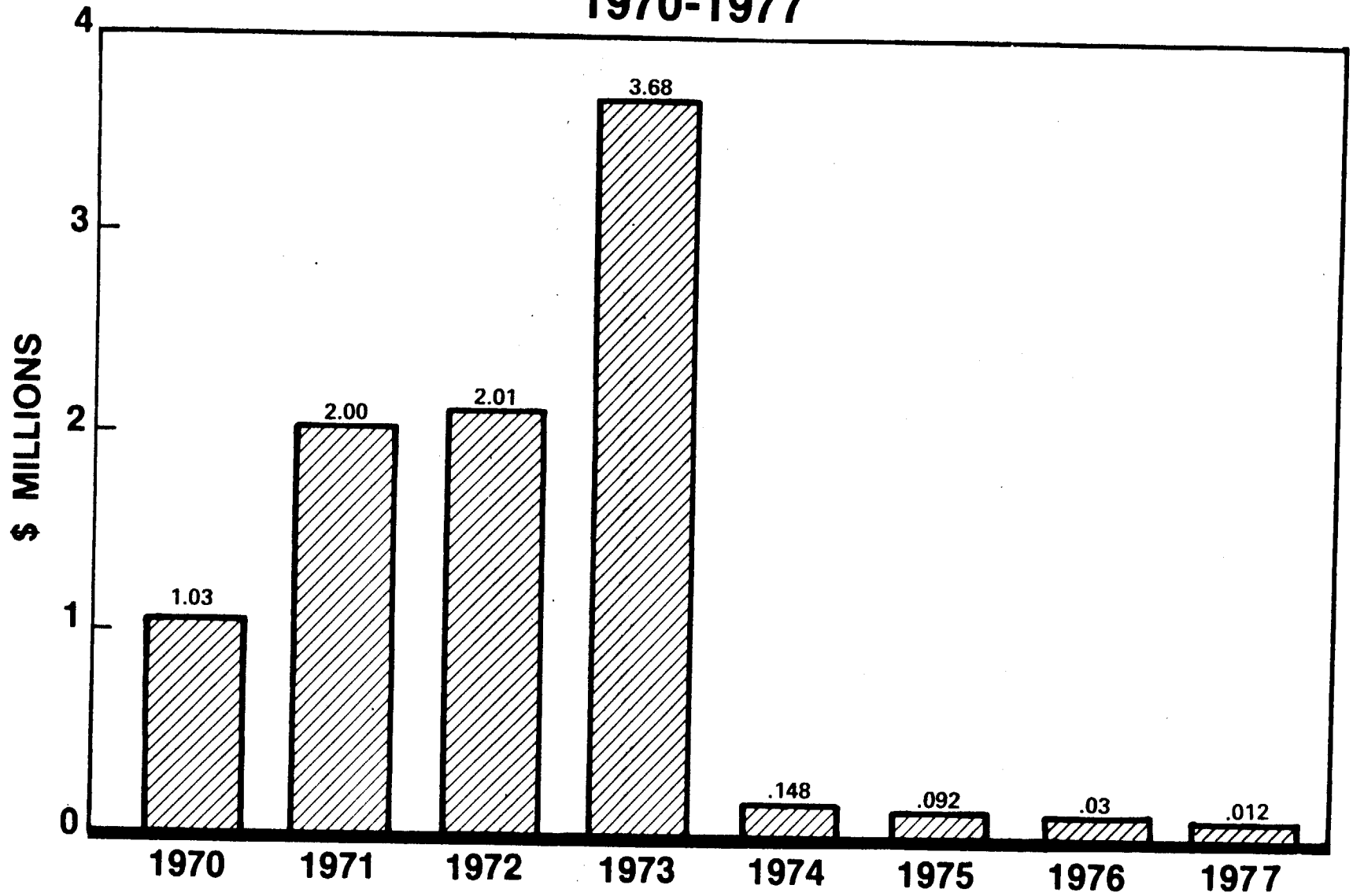
AVIATION FLIGHT ACCIDENTS RATES - NO. OF ACCIDENTS PER 100,000 HOURS

FLIGHT ACCIDENT RATE	20	0	4	11	14	9	4	0	0
FATAL ACCIDENT RATE	0	0	0	7	4	0	0	0	0
AIRCRAFT DESTROYED RATE	15	0	4	7	7	4	0	0	0

FLIGHT ACCIDENTS SUMMARY

CATEGORY OF AIRCRAFT									
ADMINISTRATIVE	1	0	0	0	0	0	0	0	0
PROGRAM SUPPORT	3	0	2	2	1	2	1	0	0
R&D	1	0	0	1	3	0	0	0	0

NASA AIRCRAFT LOSSES
1970-1977



NASA HQ DS77-2851 (1)
Rev. 6-29-78

NASA MOTOR VEHICLE ACCIDENTS

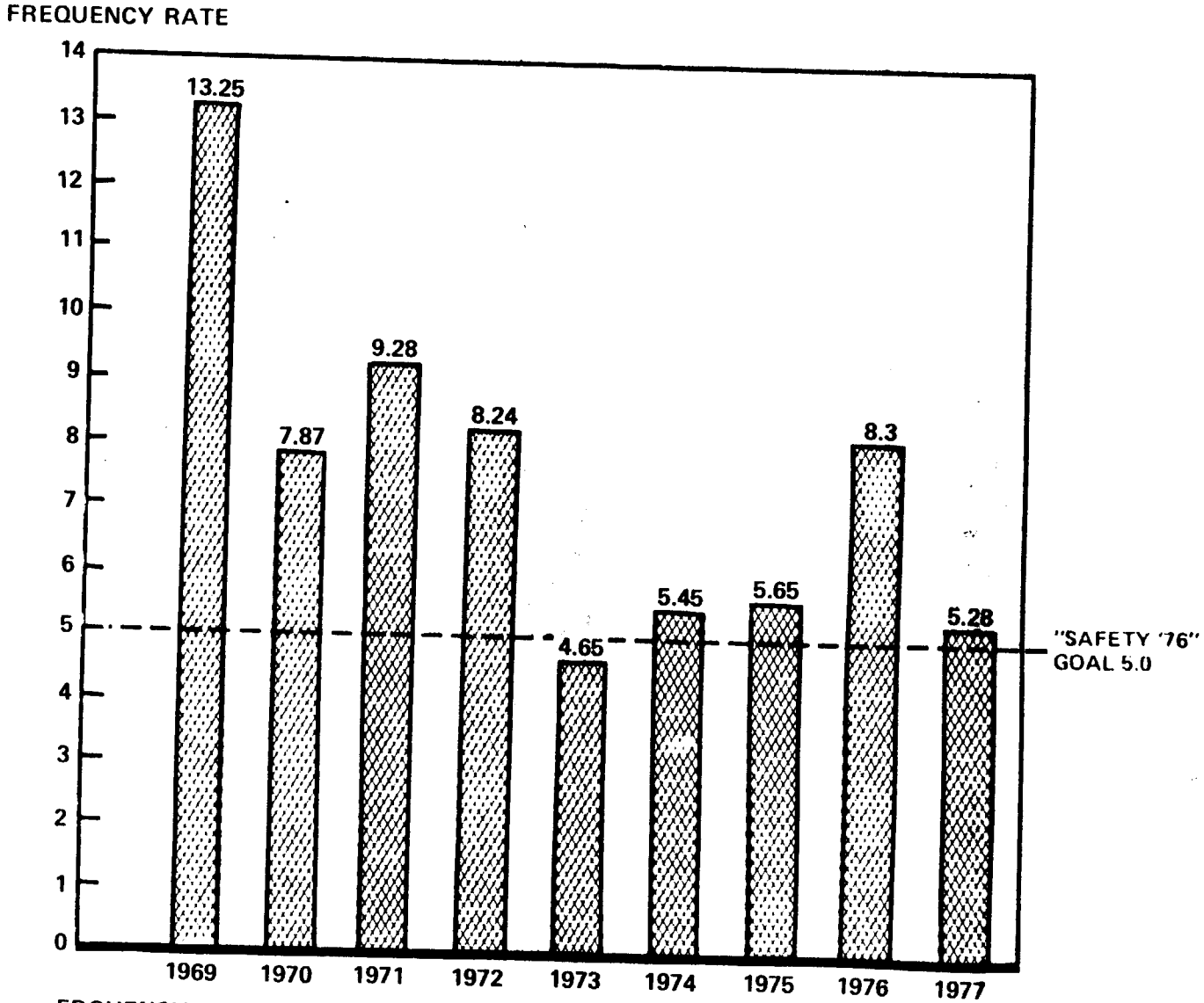
There was a significant decrease in both the automotive accident frequency rate and the costs of accidents for 1977. Although we did not reach the "Safety '76" goal of 5.0 accidents per million miles driven, which we met in 1973, this year the rate approached it by achieving 5.28, and the costs decreased dramatically.

Either employees are not reporting damage to their private vehicles while using them for official business, or they are driving them much more carefully than they do U.S. vehicles. Management is urged to evaluate the driving practices and disciplinary needs to get the attention of those who do not observe traffic laws and good practices.

Five installations reported zero accidents while driving 1,714,000 miles in government-owned vehicles and 2,040,000 miles (official business) in private owned vehicles. This is 18 and 35 percent respectively of the total miles driven. There were only two accidents reported, both from the same center, while driving privately-owned vehicles 5,810,000 miles. There were fifty-five accidents reported while driving government-owned vehicles 9,402,000 miles. Have you examined the reasons for this great difference?

Let's buckle up for safety!

NASA GOVERNMENT MOTOR VEHICLE ACCIDENTS

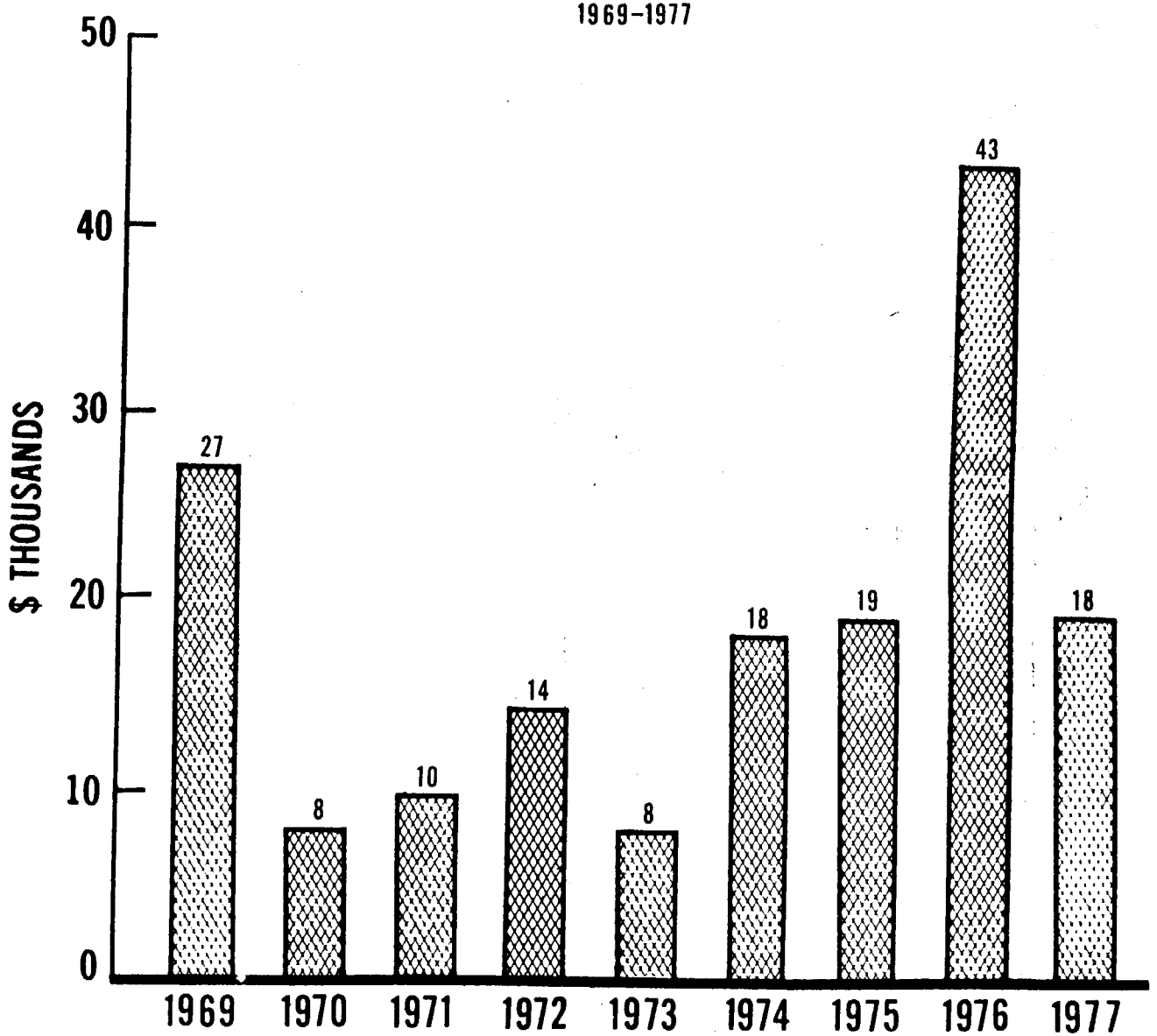


FROQUENCY RATE IS THE NUMBER OF MOTOR VEHICLE ACCIDENTS PER MILLION MILES DRIVEN.

NASA HQ DS78-2331 (1)
5-11-78

NASA AUTOMOTIVE LOSSES

1969–1977



NASA HQ DS78-3182 (1)
5-11-78

NASA 1977 MOTOR VEHICLE ACCIDENTS

Field Installations	No. of Accidents Govt.	Private	Total Miles Driven (in thousands) Govt.	Private	Total Cost Govt.	Private	Frequency Rate* of Accidents Govt.	Private
AMES	4	0	1,049	598	2,423	0	3.81	0
DRYDEN	0	0	892	112	0	0	0	0
GODDARD	23	0	3,253	1,237	10,658	0	7.07	0
JOHNSON	0	0	370	1,079	0	0	0	0
KENNEDY	10	2	1,014	775	2,503	265	9.86	2.58
LANGLEY	0	0	355	613	0	0	0	0
LEWIS	15	0	675	0	1,363	0	22.21	0
MARSHALL	2	0	2,046	1,159	42	0	.98	0
MICHOUD	0	0	2	4	0	0	0	0
NSTL	NOT AVAILABLE				NOT AVAILABLE			
WALLOPS	1	0	665	0	804	0	1.50	0
HEADQUARTERS	0	0	95	232	0	0	0	0
NASA (TOTAL)	55	2	9,402	5,810	17,793	265	5.28	.34

* FREQUENCY RATE IS THE NUMBER OF ACCIDENTS PER MILLION MILES DRIVEN

NASA FIRE EXPERIENCE IN 1977

Through the efforts of all personnel, both the number of fire mishaps and their costs for 1977 were at an all time low, provided one does not include the two test stand fires which were caused by and involved the Shuttle Main Engines being tested. The combined cost of these two fires was $5.7 million.

This excellent record is the direct result of extensive fire prevention activities and excellent fire safety awareness created at all facilities. We must not allow the results of these efforts to foster a false sense of security or complacency which precedes the relaxing of our vigilance and determination or serves to initiate reduction of fire safety resources.

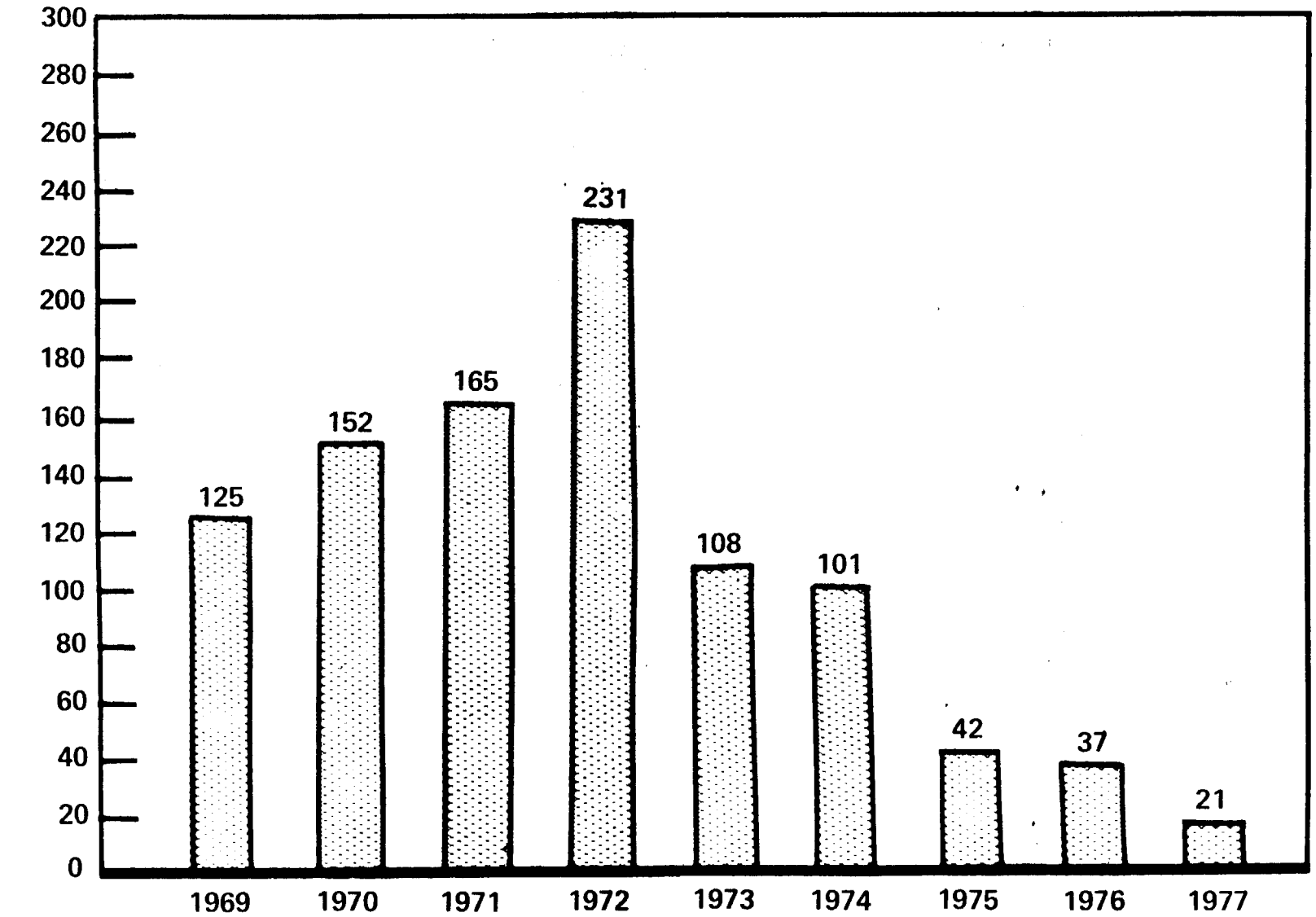
In consideration of other items, such as reduced funding levels, changes in occupancies, operations, and facilities, reduced staffing levels, and energy conservation, we must, in fact, reinforce and bolster our fire safety emphasis.

At this stage in the NASA mission, fire could have a more disastrous effect on our future than ever before; because we may not get the funding from Congress that would be necessary to replace a facility.

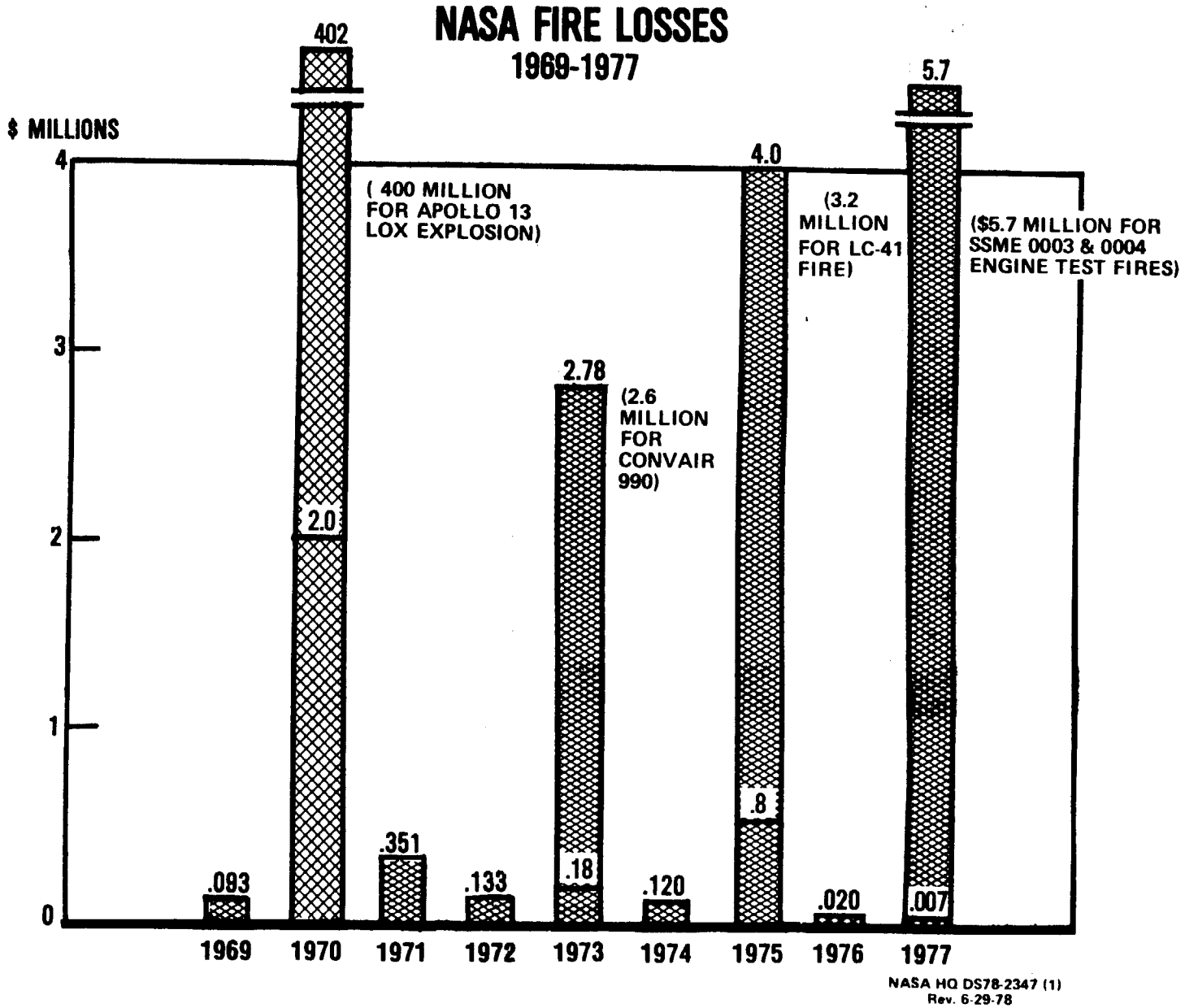
Programs to provide fire detection and suppression systems and to require safe materials and construction must be continued. Fire prevention must start on the drawing board and continue through all phases of projects. Training and education of employees and professional development in the technology and state of the art for fire safety personnel must be expanded.

Attention to balanced risk surveys and development of fire safety master planning concepts will provide the tools to permit a level of fire safety to be achieved, which will justify the effort and further reduce fire mishaps and losses which threaten life safety, jeopardize the NASA missions, and waste resources.

NUMBER OF NASA FIRE MISHAPS



NASA HQ DS76-2594 (1)
5-11-78


NASA FIRE LOSSES
1969-1977
$ MILLIONS
4
3
2
1
0
402
2.0
.093
.351
.133
2.78
.18
.120
4.0
.8
.020
5.7
.007
(400 MILLION FOR APOLLO 13 LOX EXPLOSION)
(2.6 MILLION FOR CONVAIR 990)
(3.2 MILLION FOR LC-41 FIRE)
($5.7 MILLION FOR SSME 0003 & 0004 ENGINE TEST FIRES)
1969
1970
1971
1972
1973
1974
1975
1976
1977
NASA HQ DS78-2347 (1)
Rev. 6-29-78

LOST TIME INJURY BRIEFS
1973
(GOVERNMENT EMPLOYEES)

NATURE OF INJURY	No. Days
Tripped on a wire cord in aisle; strained left shoulder, contusion to left leg.	1
Storing old records, lifted boxes improperly; back strain.	1
Employee caught and crushed third and fourth fingers in door that closed when attempting to catch heavy plague that was falling from an adjacent wall.	1
Employee felt pain after lifting IBM card boxes down from shelves and back up again; strain, neck and right shoulder.	1
Employee felt pain while moving heavy equipment; strain lower back.	1
Employee hit head on aircraft engine bay door; lacerated scalp.	1
Employee probably twisted while picking up tapes and stacking them; strained back.	1
Employee strained muscle in right shoulder while climbing ladder.	1
Employee stepped on rock in parking lot; sprained left ankle.	1
Employee unrolled Facility drawings, one drawing struck him in the eye; corneal abrasion, left eye.	1
Employee was changing the chain operated valves of the drying tower system when object got in his eyes; foreign body.	1
Employee was placing collet chuck in storage cabinet, it slipped off the shelf and struck right foot; contusion.	1
Employee was working below cooling tower deck in stooped position, raised up and struck shoulder; contusion, right shoulder.	1
Employee working on motor control unit. Control unit circuit breaker was closed by the injured employee, electrical short circuit; arc burned eyes.	1
Slipped while moving through water on floor; sprain, left ankle.	1
Tripped over broken sidewalk; sprained right foot and ankle.	1
Walking across street, employee twisted right ankle; sprain.	1
While cutting a duct, knuckles hit a jagged edge of metal; infection, right hand.	1
While checking cooling tower water screens, employee stepped on grating over tower pit, grating slipped and struck employee's left leg; laceration and abrasion.	1

While lifting a magnet a tack welded bar was knocked off, fell and struck foot; contusion, right 2nd toe.	1
While opening file cabinet drawer which appeared to be stuck, employee strained muscle in left thigh.	1
While pounding out fender dent, butt of hammer handle struck first and head struck thumb; fracture, left thumb.	1
While turning, employee twisted his knee.	1
While walking on icy sidewalk, slipped and fell; contusion of left knee.	1
While working on a heavy item, employee experienced discomfort in the abdominal region.	1
After an unusually heavy snow, employee was going out building door; snow from the roof fell on head; contusion, top of head.	2
Caught and twisted foot on trough in working surface while sliding a plate on surface; strain, back.	2
Crawled in and out of confined space using ladder access and felt pain; strain, back.	2
Crossing parking lot, stepped on piece of gravel causing foot to turn and injured ankle bone; chip fracture.	2
Employee developed muscle strain when lifting computer printout summary sheets.	2
Employee jumped over snow pile, twisting leg while landing; strain, right leg.	2
Employee lost footing near excavation sites; small superficial laceration.	2
Employee sat in swivel chair, leaned back and fell over, struck back on floor; multiple contusions.	2
Employee stubbed great toe when he walked into a GSA partition while reading a document.	2
Employee tripped on pants leg and struck adjacent desk; contusion face and abrasions left ear.	2
Employee twisted knee getting off stool.	2
Employee twisted knee while walking down stairs.	2
Employee was assisting in lifting air conditioning coils; strained muscle in back.	2
Employee was handling nitrogen gas bottle with another employee in a tight location, employee slipped and his arm hit steel support; muscle strain cervical area and right trapezius.	2
Lifted piece of aluminum from shelf on machine shop ramp and carried to band saw inside shop; later returned unused portion back to shelf; lower back pain.	2
Pulling on handle of desk drawer; strain right shoulder.	2

Ripping a piece of wood about 3 feet long, failed to use block to shove material through saw, hand slipped; laceration left thumb.	2
Slipped on snow and twisted knee; strain, right knee.	2
Strained back lifting file cabinets.	2
Twisted ankle while stepping off the curb; sprained left ankle.	2
While driving around curve in road, motorcycle skidded and employee fell; multiple abrasions and contusions of hands, right shoulder, and right knee.	2
While handling a 9-pound piece of steel, the employee dropped the piece which struck arch of left instep causing abrasion of same.	2
While sitting at desk, employe turned to get up, felt pain in left knee.	2
While working inside a large exhaust pipe, employee slipped on wet rounded surface and fell against the pipe; bruise, left side.	2
Slipped on shower floor; inured back and buttocks.	2
A length of steel fell and struck foot; bruise, right foot.	3
Employee inspecting spacecraft on hands and knees. Noted discomfort in right knee. Remained home three days. Knee swollen and hard. Diagnosed as bite or sting of an insect.	3
Employee leaned back in office chair, reached to steady self. Jammed hand into adjacent wall; injured fingers.	3
Employee slipped and fell on steps when exiting building; abrasion of right lower leg.	3
Employee slipped on sidewalk (carpet); fractured left wrist.	3
Employee stooped to pick up box; severe pain in back.	3
Inhalation of toxic fumes circulated in building air conditioning; severe headache, nausea, and respiratory problems.	3
Tissue holder on toilet door opened and fell on head injurying same.	3
While bending to put trash paper in basket felt pain; muscle spasm, back.	3
While parking her car, employee's foot slipped off the brake and hit the accelerator; fracture.	3
While riding in an elevator, employee suffered back aggravation as elevator reached top of building and suddenly slipped 4" to 8" and jerked back up. Elevator required adjustment.	3
While adjusting a breaker with a drill motor, ran to stop and motor twisted in hand; fractured, finger bone of left hand.	3

Wind blew dust in employee's eyes, foreign particles in both eyes.	3
A car made left turn and struck employee riding bike.	4
Employee lifted rotor removed from model motor; low back strain.	4
Employee lifted typewriter to get serial number, had spasm in back, dropped typewriter.	4
Employee was exiting building and slipped on wet steps; sprained left ankle.	4
Employees foot went to sleep while sitting on drafting stool. Started to walk, ankle turned; fracture.	4
When faced with critical driving situation, exerted unusual effort to operate horn; strain to left chest area.	4
While grinding a piece of metal, small piece got in eye.	4
Moving batteries by sliding along floor, package struck protrusion; strain, lower back.	4
Picked up tool box and put it on truck; strain, upper back.	5
Lifted container from auto; strain, right hip.	5
Lost balance and fell when a bolt broke, bumped back on piece of angle; contusion, lower back.	5
Slipped on ice; bruised coccyx.	5
While lifting heavy steel rack, lost balance, sudden movement to protect feet caused pain; strain, lower back.	5
Dumping trash into dumpster, load shifted, lost balance, and fell from dumpster. Broke end off left elbow at muscle attachment point.	6
Employee lifted benches and equipment, felt pain; strain, lower back and left leg.	6
Employee lifting tow bar to attach to aircraft tug; sprained back.	6
Employee struck ankle against the base of swivel type office chair; contusion of left ankle.	6
Employee twisted right foot walking on uneven pavement in parking lot; broken foot.	6
Employee was hurrying around desk, caught toe of shoe in the base assembly of chair; strained knee.	6
Slipped on smooth, wet granite outside steps; strain, back.	6
Struck hard hat on pipe protrusion and blow carried over into back; strain, lower back.	6
While lifting dry nitrogen bottles, employee injured lower part of back.	6
While placing carton in auto, the door closed on wrist and fractured left wrist.	6
Slipped and fell; bruised left ankle and right elbow.	7

Using hand drill, it twisted out of hand; bruised fingers on right hand.	7
Walking to cafeteria, twisted ankle and sprained right knee.	7
While sanding a piece of aluminum plate on a floor mounted disc sander, employee caught fingers in disk, multiple lacerations.	7
Lifted a portable electric hydraulic pump weighing 70-80 lbs.; lower back strain.	8
While cutting aluminum angle on band saw, material slipped; middle finger contacted cutting edge of blade.	8
Car accident; severe injury to right leg, minor injury to forehead, left wrist, knee and stomach.	9
Employee apparently slipped on a piece of paper on floor; twisted foot and ankle.	9
While lifting a battery felt pain; strain, lower back.	9
Employee reached over his head in an awkward position to place container of photographic chemicals on shelf; low back strain.	10
Lifted electronic equipment from one bench to another; equipment weighed about 90 lbs.; lower back strain.	10
Employee was turning over a piece of plumbing equipment on floor; strained groin muscle.	11
Slipped and fell while walking on roof covered with snow and ice.	11
Ladder slipped and fell with employee on it; fractured left arm.	12
Four employees were exposed to the herbicide Fenocil (Trademark) fumes/vapors as it was being applied to exterior of building. It was inducted into the air-conditioning system.	14
Loading material on truck; employee strained back.	14
While hanging a large pipe, employee reached to steady it and felt pain; strain, lowerback.	14
A flange slipped from hand and fell, struck instep; contusion, left foot.	15
Employee lifted a trailer tongue and felt pain; strain, lower back.	15
Employee was in squatting position to obtain file from a lower file cabinet drawer and twisted knee; sprained knee.	15
Employee was participating in NASA organized basketball game; broke his foot.	15
Employee was seated on 26-inch laboratory chair observing calibration of instrument. While repositioning self, foot slipped off rung, causing him to fall; injured right knee.	15
Employee was welding, got feet entangled in welding lead, welding hood fell over face, and he fell and struck garbage can.	15

While getting into standing position from kneeling, the knee joint became painful; strain, right knee.	16
Fell off stool; bruised left arm and back.	17
Crossing street in snowstorm, slipped and fell, jumped to avoid being hit by truck; contusion to back and twisted right knee.	18
Moved a work bench and strained lower back.	18
Operating tube flaring machine, employee's finger was caught in split die; partial amputation.	20
Employee fell off motorcycle when crossing ditch; acute 3" angled lacertion right ankle median, moderate contusions and abrasions, right ankle and foot.	21
Employee slipped on wet floor, grabbed a chilled water valve to keep from falling; dislocated left shoulder.	21
Car accident; rear end collision; severe muscles spasms in neck and sore right shoulder.	22
Employee was sitting in defective chair, leaned back, chair flopped backwards because of a short leg. Employee jerked forward; muscle strain.	22
Employee lifted an array of electric equipment and felt pain; strain, right inguinal.	23
Oil from accumulator drain ran on surface where employee was standing. Employee slipped while bending under pipe and fell; contusion, right upper back and two fractured ribs.	23
Caster broke off chair when employee sat down at desk. Fell backward, parallel to desk, striking shoulder and head on floor. Twisted left hip because leg was caught between chair and desk.	26
Employee bent over to transfer safety hats from one box to another, spasm in lower back; could not stand erect.	26
While going up outside concrete steps from basement, missed step and dropped to knee on concrete step; contusion and fracture, right patella.	26
While lifting 50 lb. weights, employee strained back.	26
Employee crossing parking lot toward building to return to work, was struck by vehicle exiting lot; injury to left side and left hip.	28
Handicapped person severely bruised knee, lower and upper leg. Was not following recommended procedure to receive assistance. Attempting to proceed to work area while unassisted.	30
While attempting to lift a man out of an Orbiter simulator seat, employee had a severe muscular spasm in the lower back.	30
Used 7" Type 27 grinding wheel on portable grinder at high speed without guard and was struck by pieces of the bursting wheel; laceration, abdomen.	31

Employee operating bicycle, lost control and fell to pavement. Fractured wrist, sprained ankle and back.	32
Lifting two boxes of live pigtail monkeys; lower back strain.	33
Employee parked car in lot for handicapped, stepped from curb to sidewalk, fell face down, injured both knees and abrasions to nose and forehead. Did not follow direction to obtain assistance.	36
Burned ankle from treatment at health unit.	39
An employee lifting a power supply from a skid felt pain; strain, left inguinal.	42
Slipped and caught wall; lumbar muscle spasm in right hip.	48
While working on a job in a stooped position, employee turned or pivoted to reach for a piece of material. His knee twisted; internal derangement of the right knee.	65
Employee was installing breathing air control panel when the manifold blew up causing a compound fracture to the right forearm.	87
Two employes were lifting an equipment rack from welding table to rolling table. One employee stepped on ground cable, it rolled, he fell against table; back injury.	100
Employee stepped backwards against a cardboard box and lost balance; back strain.	114
While taking down a bulletin board notice, felt a pain; strain, back and left side.	131
Employee going to use calculator on table, cord between table and desk, attempted to move table to get cord; severe pain in lower part of back.	176
Employee fatally injured in chartered aircraft crash while returning from business meeting at Los Alamos Scientific Laboratory (on detached duty).	6000
Employee fatally injured in commercial aircraft crash while traveling on official trip.	6000

LOST TIME INJURY BRIEFS
1977
(CONTRACTOR EMPLOYEES)

NATURE OF INJURY	No. Days
Employee slipped on loose tile, fell to floor and bruised hip.	1
Employee slipped on spilled substance in hallway and fell, strained back muscles during fall.	1
Employee slipped on steps; back injury.	1
Employee slipped on wet floor, lost balance and hit back of neck on pipe, resulting in neck strain.	1
Employee stepped off platform of truck to building ramp and twisted ankle, resulting in a sprain.	1
Employee sustained injury (bruised and swollen) to right knee when struck by brass hose coupling while participating in fire department apparatus/crew drill; contusion right knee.	1
Employee tripped over box of material and fell, jamming left arm into shoulder.	1
Employee twisted an ankle and fell while walking across grassed area to a sidewalk; possible strain of ankle.	1
Employee was attempting to get a box of paper from an overhead shelf. The box fell and struck her right knee.	1
Employee was carrying gas from the fuel trailer to the fire training pit and strained back.	1
Employee was cleaning water from the floor with a mop. He slipped and fell injuring his face.	1
Employee was handling 50-pound weights in clean room - lifted weights out of tank - turned body at waist, injured back. Severely strained lower back.	1
Employee was helping place equipment on storage shelves when a pipe fell and hit him in the chest.	1
Employee was leaning over in a chair when the chair was struck from behind by a fast-moving four-wheel cart; lower back strain.	1
Employee was tinning wires - wire sprang back throwing solder into eye.	1
Hit on head by falling socket wrench; scalp laceration.	1
Lifting power supplies; backstrain.	1
Pulling to tighten bolts; torn ligament, right arm.	1
Removing ice from plenum deflected piece hit employee on head (below hard hat); lacerated scalp.	1
Unsteady cabinet tipped over hitting employee's leg and ankle.	1
While carrying some channel iron through a high bay door, the door came down and struck the employee on the head. This caused him to hit the bridge of his nose on the iron and cut his nose.	1

While loading a computer with power on, the employee released the servo brake, causing left hand to be pulled into take-up reel. Cut finger and hand.	1
While walking down a dark hall to turn on the lights, employee slipped and hurt his right leg.	1
Employee had an eye irritation and infection caused from particles of foreign matter in his eye.	2
Employee hurt the right side of his chest. As he was lifting some boxes, he put weight on the right side of his shoulder.	2
Employee lifted 1 1/4" bender off tailgate and turned to set it down; felt pain in lower back.	2
Employee lifted heavy plastic bag of trash from barrel, braced himself and lifted bag with one arm causing strain of right arm.	2
Employee lifting up on tool while trying to tighten tube fitting; strained back.	2
Employee slipped on pencil that was laying on warehouse floor, pulled tendon - right foot. Strain on Achilles tendon.	2
Employee sprained wrist while helping remove a "skid" hose load board and hose sections from fire truck; sprained wrist.	2
Employee tripped over a wheel chock (stop) in parking lot and fell, bumped his head; contusion of head.	2
Employee was descending ladder, stepped on piled-up grating and sprained left ankle.	2
Employee was driving rental car on main highway; another car pulled into path from shopping center parking lot. Employee suffered a laceration to lip and multiple bruises.	2
Employee was removing chamber from pallet, dropped chamber and smashed finger.	2
Employee was trimming honeysuckle bed, trimmer got tangled in vines, pulled to free it, lost balance and trimmer cut leg.	2
Employee was walking across slightly wet pavement when she slipped and fell. She sustained a hairline fracture of her right ankle.	2
Employee was welding and finished a bead, stepped back and raised his hood; a piece of metal popped off bead and struck him in the right eye.	2
Employee was working on equipment when he backed into a valve striking his elbow.	2
While loading empty K-bottle onto pickup truck, right index finger of employee was caught between bottle and the fender well; contusion of finger.	2
Clearing barrel from obstruction; pain lower back.	3

Employee dropped 40-pound switch box on left foot; bruised foot.	3
Employee felt sudden back pain while lifting a thrust chamber cover.	3
Employee leaned backwards and pushed stool away from table; stool went over backwards causing employee to strike head and back on floor. Strained back and mild concussion.	3
Employee thrown against inside of search vehicle during launch (OTS) recovery operations causing fracture of 6th rib (right) and contusion of right hip.	3
Employee twisted and sprained his left ankle while placing wet hose section on wooden hose rack; sprained left ankle.	3
Employee was lifting pipes from a transport cart. He subsequently suffered muscle spasms.	3
Employee was running from car to building during heavy rain. Employee attempted to jump puddle, slipped and broke leg.	3
Employee was stung by wasp on forehead and right shoulder, while trimming shrubs.	3
Removing safety valve from piping system; pain left wrist.	3
Using torque wrench in awkward position; pain in stomach area, possibly a hernia.	3
Employee bent down and lifted the front end of a buffing machine, spasm in back; strained back.	4
Employee was brushing rusty part with rust stripper. Drops of stripper flew up entering eye. Caustic burn to right eyelid.	4
Employee was grinding material and was utilizing a face shield. Evidently a foreign body entered eye - did not begin to burn until later. Foreign body in right eye.	4
Employee was lifting a metal shipping container when he felt a pain in his lower back. He had a helper, but apparently did not use proper stance.	4
Employee was preparing heat exchanger for tack welding - exchanger fell striking him on head. Severe blow on head.	4
Employee was stung by wasp while clearing around shrubs; allergic reaction which caused eye to swell badly.	4
Employee was transferring digital mag tapes from one cart to another, employee strained stomach muscle.	4
Employee was working floor paneling fell striking top of left foot. Bruised top of left foot.	4
Lost balance, grabbed for handhold; strained muscle in shoulder.	4
Sitting in awkward position; back pain.	4

Stepped on hip boot, lost balance and fell; sprained left ankle.	4
While moving test equipment, employee made a quick movement and sprained back.	4
Employee bitten by flies while working in fence area; had allergic reaction to the bites.	5
Employee slipped and fell on right knee. The right knee was severely injured.	5
Employee slipped on the ice while repairing a pipe; sustained bruise to rib.	5
Employee was lifting recirculating pump off base and complained of pain in back; acute muscle strain, left back.	5
Moving typewriter; strained back.	5
While putting some receipts in a box, employee stooped down to place material in the box and hit tailbone on the corner of the table.	5
Employee bent over to retrieve a package of crackers from vending machine, felt sharp pain in lower back. Low back sprain.	6
Employee was using drill motor, bit stuck, drill twisted hand. Strained left wrist and hand, possible fracture.	6
Slipped on a rock, fell; broken left foot.	6
Stepping from sidewalk to road surface, employee slipped off rounded curb and fell. Bruised hip; abrasions to both arms and knee.	6
Employee strained shoulder lifting recorder; strained left shoulder.	7
Employee bumped right knee on edge of desk - knee became sore the following day. Right knee had severe pain and swelling.	7
Holding ladder in awkward postion; back pain.	7
Bumped hip on valves; bursitis.	8
Employee received sharp pain in right buttock while lifting section of soft suction fire hose; lumbosacral of buttocks, right side.	8
Employee was taking trash out, the floor was wet from rain, foot slipped, fell on right hand; severe sprain of right wrist.	8
Lifting compressor blade from cart to rack; hernia.	8
While making a delivery, employee was pulling a dollie with four boxes on it up some stairs; strained back.	8
Employee parked tug which was connected to LN2 dewar. Tug began to roll, employee struck head on canopy while trying to stop vehicle.	9
Tripped walking up stairs; twisted ankle, back strain.	9

Employee was lifting some boxes of trash; felt pain in back.	10
Moving furniture; back strain.	11
Lifting disk pack; back pain.	12
Employee was crouching to get under a beam. His knee was apparently in a twisted position as he applied his weight to stand.	14
Employee was dumping trash can into a dumpster; felt sharp pain in groin.	19
Employee received a back sprain while lifting a barrel of trash to be put into dumpster.	20
Employee was installing cabinet doors on equipment and felt pain in lower back; strain, lower back.	23
Employee was working in test areas, walked to edge of concrete apron, bitten by rattlesnake on left ankle.	27
Fell through rear exit door of CV-990; very badly bruised, various parts of body.	33
While pushing on side of security patrol vehicle stuck in mud, employee sustained sharp pain in chest; coronary attack.	44
A Hurst Rescue Tool being used by Fire Captain to cut car body. Fingers got caught between jaws of tool; severe contusions and lacerations of fingers of right hand.	61
Employee entered dark room, did not notice water on floor, slipped and sprained back.	116
Strapping conduit to pole, ladder twisted causing employee to fall and straddle ladder. Cracked vertebra and strained back.	118
While installing emergency lighting unit, lost balance and fell off ladder; injured knee cap.	135
Employee at warehouse loading material on truck; felt pain in lower part of back.	169
Employee slipped and fell on a stairway; fractured knee.	185

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978—261-371:63